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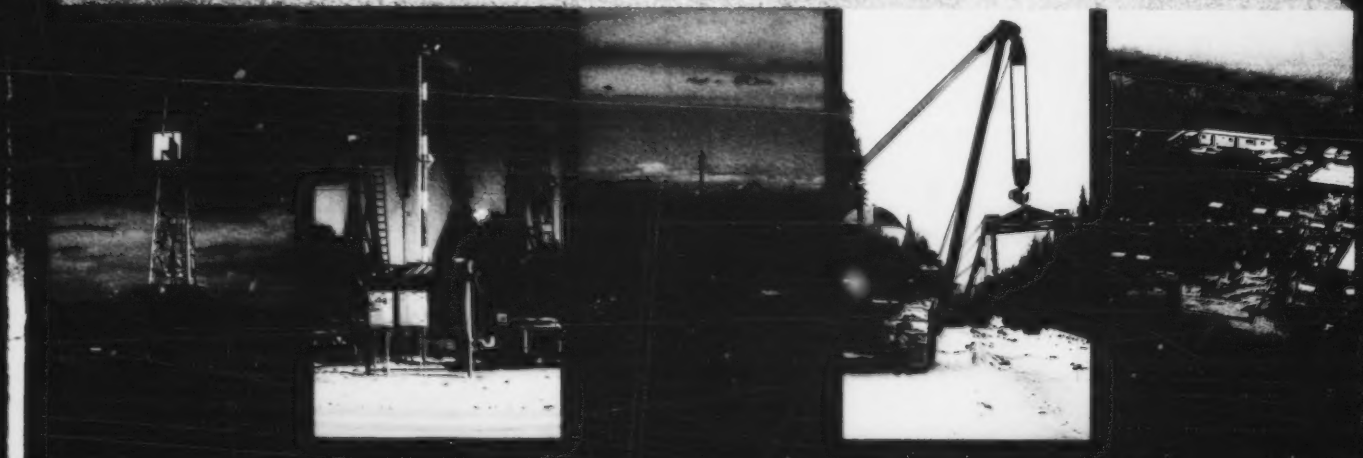
REPORT OF THE

UPSTREAM PETROLEUM INDUSTRY TASK FORCE ON SAFETY



PREFACE

In December 1987, the Upstream Petroleum Industry Task Force on Safety was formed to address the increasing concern of industry and government over worker accidents and fatalities. The task force was launched with the mandate to determine where and why accidents were occurring, and to develop recommendations and specific actions that would lead to improved safety performance. Funding and personnel for the task force were drawn from the five major industry associations, which represent a complete cross section of the companies in the upstream petroleum industry.

The task force strongly believes the ultimate responsibility for improved safety performance lies with senior management of individual companies in the industry. These executives have the power to put the necessary action plans in place; without their commitment and leadership, safety performance will not improve. For this reason, an important first step of the task force was to develop guiding principles for worker safety and have them approved by the five associations. The guiding principles are a formal statement of senior management responsibility for protecting all workers from personal injury and health hazards. These principles provide the framework for devising methods to achieve that objective.

The task force then prepared this report, which details 42 recommendations and action plans for industry and government to follow in their pursuit of a safer workplace. It also includes statistical and other relevant background information.

Contributors to this report included over 90 corporate, contractor and industry association representatives, most of whom are senior managers. The broad range of skills and experience offered by task force members helped ensure all relevant questions were addressed. Government was not represented on the task force but readily provided valuable information on request.

Major sectors of the upstream petroleum industry were studied, with a focus on Alberta data. Discussions were also held with Alberta's Workers' Compensation Board and Occupational Health and Safety department. Although much of the information presented here focuses on Alberta, the task force believes the report's findings and recommendations apply equally to upstream petroleum industry operations throughout Western Canada.

The task force has observed that, since the start of this study, safety awareness in all sectors of the industry has increased significantly. In fact, a number of new safety initiatives recommended in this report have already been undertaken, some by government and others by individual companies within the industry. It is the aim of the task force that government and industry continue this trend by implementing all recommendations contained in the report. The task force is confident this dedication will significantly improve safety performance in the upstream petroleum industry.

ACKNOWLEDGEMENTS

The Upstream Petroleum Industry Task Force on Safety would like to acknowledge the following associations for their contributions of time, committee members and funding, and their overall direction of the project:

Canadian Petroleum Association
Independent Petroleum Association of Canada
Canadian Association of Oilwell Drilling Contractors
Petroleum Services Association of Canada
Small Explorers and Producers Association of Canada

The task force would also like to recognize the invaluable contributions of all those who participated as members of the Task Force Steering and Working Committees (see Appendix A, page 50 for a complete list). Without the input of these people, this report would not have its breadth of coverage or contain such strong and realistic guidelines for improving the safety record of the industry.

Gratitude is further extended to the Alberta Occupational Health and Safety department and to the province's Workers' Compensation Board for statistical research and support.

A final note of appreciation goes to Esso Resources Canada Limited, Oilweek Magazine, Shell Canada Limited, Halliburton Services Ltd., Western Rock Bit Company Limited and Travis Chemicals Inc. for their contributions of photographs.

HOW TO READ THIS REPORT

This report contains four main sections:

INTRODUCTION

The Introduction presents the scope and background of the report, and lists industry sectors studied by the task force.

EXECUTIVE SUMMARY

A brief overview of all recommendations, and key background information specific to each one, is contained in the Executive Summary.

RECOMMENDATIONS FOR INDUSTRY AND GOVERNMENT

In this section are detailed recommendations 1 through 26. These recommendations apply to most or all industry sectors.

RECOMMENDATIONS FOR SPECIFIC INDUSTRY SECTORS

Recommendations 27 through 42, which apply only to certain specific industry sectors, are detailed in this fourth section of the report.

The following guidelines are offered for most effective use of this report:

1. **For an overview** of the report's background and recommendations, read the Introduction and Executive Summary. The Executive Summary also makes reference to a brief table of the recommendations, entitled Summary Table of Recommendations, which is contained both in Appendix D and the pocket on the back cover. The table in the pocket can be removed from the report for use as a wallchart.
2. **For more detailed information**, read the Introduction and the two sections containing recommendations: Recommendations for Industry and Government and Recommendations for Specific Industry Sectors.
3. **To find recommendations for a particular industry sector**, read
   a) the entire section Recommendations for Industry and Government because the recommendations in this section apply to most industry sectors, and
   b) the portion of the Recommendations for Specific Industry Sectors for the particular sector of interest. Each sector is listed by name in the Table of Contents.

The report also contains a glossary of terms and acronyms on page 49.

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INTRODUCTION

Since 1980, the upstream petroleum industry has experienced 129 fatalities and over 21 000 lost-time accidents in Alberta alone. The number of fatalities per year has risen as high as 23 while lost-time accidents have peaked at 3337 (see Figure 1).

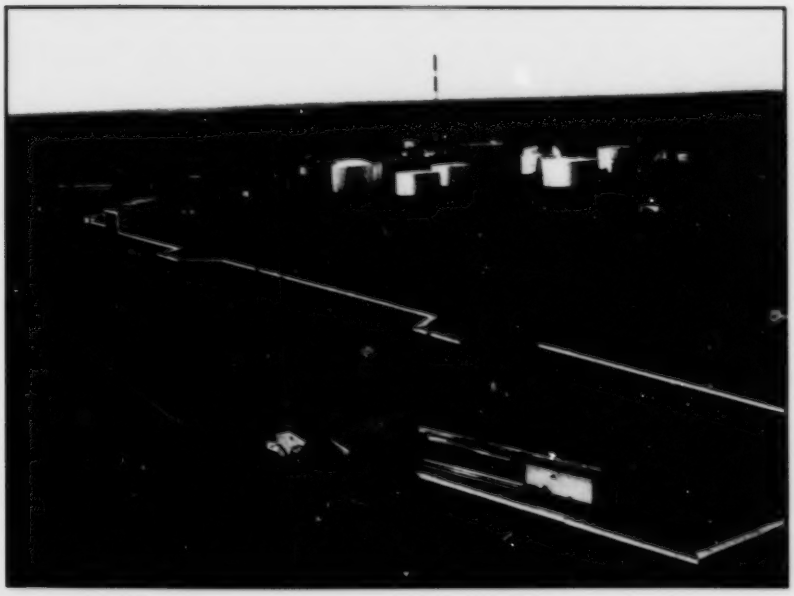
Many of these injuries and deaths, along with the human suffering associated with them, could have been prevented. Unless something is done, more are expected to occur and industry cannot afford their mounting human and financial costs.

In view of these concerns, the Upstream Petroleum Industry Task Force on Safety was formed to study ways of improving safety performance in the industry. Through this task force, the major areas of the upstream petroleum industry have been studied in detail. The result is this report, which contains 42 recommendations aimed at reducing accidents and better managing and monitoring safety.

Many corporations, contractors, industry associations, government agencies and individual employees have shown strong support throughout the study. With the publication of this report, the program moves into the implementation stage. It is of paramount importance those involved in preparing the report and senior management in the industry commit to implementing the task force's recommendations to improve safety performance. The task force believes senior management has the key responsibility for implementation because these executives have the power to put the necessary action plans in place.

TASK FORCE SCOPE

The main objectives of the task force were to identify and study key areas that affect safety, determine where problems exist, and submit recommendations for improvement to both industry and government. An additional and very important function of the task force was to outline plans for implementing and monitoring its recommended action plans.



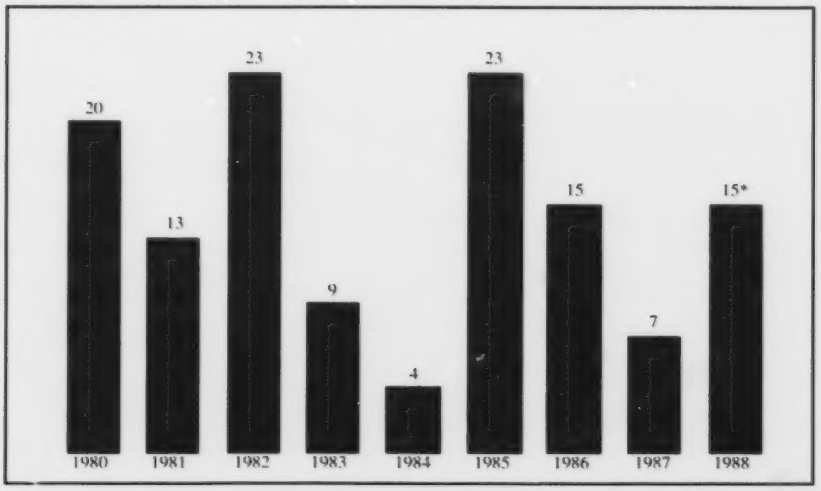
The task force examined the following industry sectors:

- drilling, servicing and associated operations
- field operations
- field construction
- exploration
- transportation

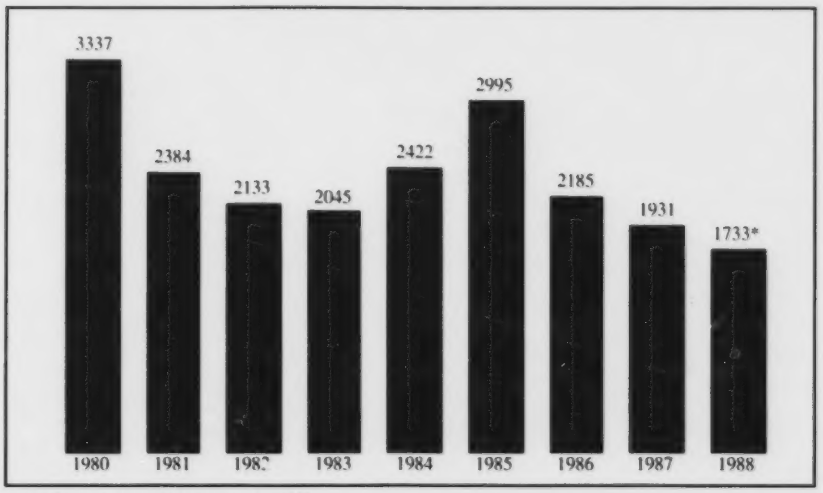
Offshore petroleum operations were excluded from this study because they were examined in detail several years ago in the Safety Task Force Report produced by the Eastcoast Petroleum Operators' Association/Arctic Petroleum Operators' Association (EPOA/APOA) as a result of the Ocean Ranger incident. Downstream sectors were also excluded.

The geographic scope of the project was Western Canada because it has the highest concentration of onshore petroleum industry activity in the country. The majority of research and analysis was based on Alberta data, but it is believed to be applicable to onshore petroleum operations throughout Canada.

FATALITIES IN THE UPSTREAM PETROLEUM INDUSTRY, 1980-1988



LOST TIME ACCIDENTS IN THE UPSTREAM PETROLEUM INDUSTRY 1980-1988



* for January 1 through November 30, 1988.

NOTE: These figures are from WCB, Alberta claims statistics and cover all WCB classifications for industry sectors studied by the task force (excluding oilfield trucking and field construction, for which WCB does not have specific classifications). Appendix B, page 56, contains a list of the classifications included, as well as a yearly breakdown of fatalities, lost time accidents and WCB claim costs for each

FIGURE 1: Fatalities and Lost Time Accidents in the Upstream Petroleum Industry, 1980 - 1988

KEY AREAS OF STUDY

In preparing the recommendations in this report, the task force examined 13 key areas:

1. potential for the development of a basic safety program for industry

2. development of methods to monitor and review implementation of a safety program
3. industry bidding procedures and safety requirements in contract documents
4. accident statistics for all areas of this study
5. quality, training, numbers, scope and mandate of Occupational Health and Safety (OH&S) inspectors
6. the legislation of OH&S, Workers' Compensation Board (WCB), and Energy Resources Conservation Board (ERCB) to determine where changes are necessary
7. government and industry safety training facilities to determine adequacy of quality, amount, coverage and funding
8. adequacy of on-site equipment inspection procedures and regulations by industry and government
9. need and desirability of certification of key supervisory personnel
10. adequacy of equipment specifications, design standards and operating procedures for activities commonly recognized as having safety problems
11. the OH&S Oil and Gas Action Plan
12. findings and methodology of the EPOA/APOA offshore safety report
13. the 1979 SAGE Institute report on safety in the oilfield and the status of its recommendations

TASK FORCE ORGANIZATION AND MEMBERS

The task force was divided into five working committees, one for each industry sector. Some of these working committees were further divided into subcommittees. The organization of the task force is shown in Figure 2.

The working committees were led by a steering committee, which consisted of representatives from all five industry associations:

- Canadian Petroleum Association (CPA)
- Independent Petroleum Association of Canada (IPAC)
- Canadian Association of Oilwell Drilling Contractors (CAODC)
- Petroleum Services Association of Canada (PSAC)
- Small Explorers and Producers Association of Canada (SEPAC)

Appendix A, page 50, lists all members of the various task force committees. Descriptions of the industry associations can be found in Appendix C on page 61.

GUIDING PRINCIPLES

One of the first and most important undertakings of the task force was to prepare a set of Guiding Principles for Worker Safety. These principles are a formal statement of industry's commitment to safety and are fundamental to the attainment of the task force's goals. This commitment applies to management, supervisors and workers at all levels.

The five associations involved in the task force have endorsed the Guiding Principles by having their chairman or president sign the document. In turn, association chairmen have, by letter, asked their individual member companies to adopt the Guiding Principles as fundamental building blocks for their company safety programs. A copy of the Guiding Principles follows.

UPSTREAM PETROLEUM INDUSTRY TASK FORCE ON SAFETY ORGANIZATION AND MEMBERS

STEERING COMMITTEE

G.L. Haight (Chairperson)
- BP Resources Canada Limited

G.R. Rowan (Vice Chairperson)
- Cactus Drilling

E. Bennett
- Esso Resources Canada Limited

E.A. McMaster
- Shell Canada Limited

J.W. Gow
- Mobil Oil Canada

R.E. McLennan
- R.E. McLennan & Associates Ltd.

W.J. Hardstaff
- American Eagle Petroleums Ltd.

K.H. Lambert
- Coho Resources Limited

R.W. Pollock
- Halliburton Services Limited

W.D. Wyton
- Husky Oil Operations Ltd.

S.S. Evanoff
- Retired (formerly with Shell Canada Limited)

J.K. Jessen (Secretary)
- B.P. Resources Canada Limited

WORKING COMMITTEES

Drilling
- E. Bennett (Chairperson)
Esso Resources Canada Limited

- Drilling
- Lease & Road Construction
- Services
- Service Rigs
- Oilfield Trucking

Field Construction
- J.W. Gerritsen (Chairperson)
Dome Petroleum Limited

- Wellhead & Flowlines
- Satellites & Batteries
- Plants

Field Operations
- P.J. Van Maarion (Chairperson)
Amoco Canada Petroleum Company Ltd.

- Field & Plant Operations

Transportation
- H.F. Zey (Chairperson)
Mobil Oil Canada

- Production Fluids Trucking
- Pipelines

Exploration
- C.M. Campbell (Chairperson)
Amoco Canada Petroleum Company Ltd.

- Geophysics
- Geology

FIGURE 2: Task Force Organization

PETROLEUM INDUSTRY GUIDING PRINCIPLES
FOR
WORKER SAFETY

We, the members of the petroleum industry, have a responsibility to protect all workers engaged in its activities from personal injury and health hazards. To meet our responsibility we will operate under the following guiding principles:

RESPONSIBILITY

The operating company, when acting as principal contractor, is responsible for coordination and general supervision of all activities at the work site, including activities carried out by contractors, subcontractors and suppliers. While all parties have a responsibility to promote worker safety, the operating company recognizes its leadership role in promoting worker health and safety on the basis that it has the greatest power to influence work site situations.

PRIORITY

Activities will be conducted on the basis that safety of all personnel is of vital importance, whether those personnel are employed by an operating company, a contractor, a subcontractor or a supplier.

RECOGNITION

The process of selecting contractors, subcontractors and suppliers, and the administration of contracts, will include recognition and support of good safety performance. Support and recognition based on good safety performance will also be provided by all employers to their employees.

IMPROVEMENT

The operating company, in cooperation with others within the industry, will promote methods and practices that have potential for improving safety performance.

Chairman of the Board
CANADIAN PETROLEUM ASSOCIATION

Chairman of the Board
INDEPENDENT PETROLEUM ASSOCIATION OF CANADA

President
CANADIAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS

President
PETROLEUM SERVICES ASSOCIATION OF CANADA

Chairman of the Board
SMALL EXPLORERS AND PRODUCERS ASSOCIATION OF CANADA

EXECUTIVE SUMMARY

This section of the report summarizes 42 recommendations by the Upstream Petroleum Industry Task Force on Safety as well as the factors that led to the formulation of each recommendation. The first 26 recommendations apply to most industry sectors and to government, while the remaining 16 apply to specific sectors of the industry.

In order for any of the recommendations to be effective, senior management throughout the industry must support the goal of the task force and take responsibility for implementing the recommendations within their companies and associations.

The recommendations focus largely on ways to reduce human error, which is the cause of most industrial accidents. Human error can be attributed to improper training, disregard for safety among workers and management, fatigue, inattention to the job, and insufficient or ineffective supervision, among other things. To reduce accidents, this report contains many recommendations related to improved safety training, better qualifications for key personnel and training programs in many other areas.

Other key recommendations include:

- a government-regulated requirement for companies to have safety programs
- consideration of safety performance in awarding contracts
- initiation of a follow-up committee to monitor implementation of all recommendations
- formation of new industry associations, which would promote safety as their paramount mandate
- a more comprehensive accident data base to assist industry in identifying where safety problems lie
- improved operating standards

In this summary, the recommendations are grouped under the 10 headings used throughout the report. Reference is made to the individual recommendations for more detail.

A further summary of the task force's recommendations can be found in the Summary Table of Recommendations in both Appendix D and the pocket on the back cover. It presents each objective and proposed action plan, and identifies the parties responsible for implementing each recommendation. The table can be removed from the report for display in key areas.

RECOMMENDATIONS FOR INDUSTRY AND GOVERNMENT

MINIMUM BASIC SAFETY PROGRAM

Recommendation 1

The task force recommends government require all industry companies develop and adopt a suitable safety program. A safety program is proposed (Appendix E, page 71) that addresses management commitment and involvement; hazard assessment and control; rules and work procedures; training and motivation; communication and group meetings; and accident investigation and analysis.

Background

Companies with good safety programs generally have fewer and less severe accidents. A good safety program sets standards for training, communications, inspections, accident investigations and safe work procedures. Although many companies in the upstream petroleum industry have implemented their own safety programs, some have not. In addition, those companies that have programs have not always included all the components that make the difference between minimum standards and good safety programs.

BIDDING PROCEDURES AND CONTRACTING TERMS

Recommendation 2

To make safety an essential consideration in the awarding of contracts, companies assessing contractor bids should examine contractor safety performance, procedures and programs. Companies with good accident records, or those taking significant measures to improve their safety performance, should receive contracts over others. The task force also recommends operating companies and contractors recognize membership within associations that promote safety.

Background

Bidding procedures generally focus on job costs and schedules. Today, although some companies specify safety requirements in their contracts, there is a wide variation in bidding procedures and contractual safety requirements within the industry. In addition, economic downturns have increased competition among contractors, resulting in many companies bidding at cost to gain contracts. This, in turn, results in reduced expenditures for basic safety aspects such as safety training, and equipment maintenance and replacement.

INDUSTRY SAFETY IMPLEMENTATION COMMITTEE

Recommendations 3 and 4

The task force recommends an Industry Safety Implementation Committee be set up to ensure recommendations are adopted and to monitor safety improvements over the long term. The development of an Industry Safety Association, which would help provide training, information, public relations support, consulting services, conferences, special awards and competitions, should also be considered. The feasibility of this association should be evaluated in three years to allow sufficient time for implementation and evaluation of the task force recommendations.

Background

The task force wants to ensure its recommendations are implemented and monitored and believes the best method is through a committee of industry members. It does not want its recommendations to follow the fate of the 1979 SAGE Institute report, Safety in the Oil Fields. Neither industry nor government was charged with the responsibility of implementing its recommendations and neither had a mechanism to take such responsibility. Very little has been done with the recommendations as a result.

ACCIDENT REPORTING

Recommendations 5 through 7

Industry and government must improve and expand the accident information maintained by the WCB by working together to develop a more detailed reporting format. In addition, the government should improve access to this data through

improved computer-reporting systems. To ensure reporting is standard, the task force recommends industry and government agree to and use standard formulas to calculate accident statistics.

Background

Currently, industry is not required to report all the information necessary for proper analysis of accidents. As well, government data bases do not provide information on important details such as experience levels of injured workers and the actual number of hours worked in each sector of the industry. In addition, methods of calculating and reporting accident statistics vary among companies and government, and accident severity is not consistently reported. These factors have resulted in an inadequate statistical base, which cannot be used to accurately determine priority areas of concern.

DRILLING AND SERVICING CYCLE

Recommendation 8

Government and industry need to level the highs and lows of drilling activity through revisions to incentive programs and early planning for exploration and development drilling.

Background

Drilling activity levels fluctuate with environmental conditions, which make some leases accessible only during winter when the ground is frozen, and government incentive programs, which produce random peaks and lows of activity. The drilling industry has been able to accommodate these peaks of activity; however, the use of inexperienced workers and the excessive work hours needed to meet the various deadlines imposed by government, industry and seasonal changes, increase the potential for accidents. Industry and government need to work together to spread drilling more evenly over the traditional drilling season.

INSPECTIONS AND REGULATIONS

Recommendations 9 through 13

Qualifications of OH&S inspectors must be improved to include experience in the oil and gas industry. Government should also make an effort to coordinate the inspections of its various departments in order to reduce overlap, and should increase its inspections and assistance to companies with poor safety performance. OH&S inspectors should take a more proactive role and provide greater leadership and counselling in accident prevention with the intention of improving safety performance. In addition, government should revise the OH&S Statute and Regulations Manual to make it more useful to industry and easier to understand.

Background

OH&S inspectors need more experience within the oil and gas industry in order to be fully conversant with all aspects of the areas they inspect. In addition, inspector training needs to be improved because post-secondary training alone is not adequate and inspector training upon hiring is only minimal.

Inspections by various government departments sometimes overlap and regulations from one department to the next sometimes differ or conflict one another. This results in government and industry losing valuable time. Currently, the focus of inspections is on finding errors while providing little guidance on how to correct or prevent accidents. In addition, the current OH&S Statute and Regulations Manual is difficult to use because of ambiguous wording and a confusing format.

FUNDING CUTBACKS IN GOVERNMENT SERVICES

Recommendations 14 through 17

The task force recommends government discuss any potential cutbacks and privatization initiatives with the proposed Industry Safety Implementation Committee to ensure high standards are maintained. OH&S should fund and conduct more of its own training seminars as per its original mandate, and make its safety publications more available to the industry. In addition, OH&S should verify the quality of training programs and instructors whose names it provides to industry.

Background

There is concern the privatization of some inspections could affect standardized procedures and reduce the safety of certain industry facilities and operations. Cutbacks have already decreased the number of inspections and also the promotion and availability of OH&S training programs and publications. As well, although OH&S supplies industry with lists of programs offered by private companies as substitutes for its own decreased programming, it does not report the qualifications or competency of the personnel presenting the programs.

WORK SITE SUPERVISION

Recommendations 18 through 20

Standard training and experience levels for work site supervisors need to be developed, and only supervisors with those qualifications should be hired by operating companies. Included in required qualifications should be a clear understanding of all applicable OH&S regulations. A properly qualified operating company representative should be on site during any downhole operations. A Well Site Supervisors' Association should be formed to improve safety awareness at the supervisory level and aid the development and implementation of effective training programs.

Background

Many accidents occur because work site supervisors lack adequate experience and training pertinent to their work area and are unfamiliar with important safety procedures. This is of particular concern for supervisors working on well sites. The result has been inadequate work direction and occasionally supervisors have inadvertently directed crews to perform unsafe procedures.

Well site supervisors need minimum training and experience standards for all types of jobs they may supervise. Well site supervisors are currently required to have Level II well control certification but this does not guarantee they have adequate training or experience to ensure work is done safely. The task force believes a Well Site Supervisors' Association could best provide the forum for the development of qualification standards and training programs.

CERTIFICATION AND TRAINING

Recommendations 21 through 24

Additional certification of jobs in the drilling and servicing sectors is not considered necessary at this time. Instead of certification, industry should increase and improve training programs because this can more effectively increase the competency of all industry workers. Efforts in the industry to increase and improve safety training, as well as improve attitudes toward safety, should include establishment of minimum training standards for supervisors and development of on-the-job training programs. Industry must also make time to conduct job and site orientations for all new employees.

Background

The OH&S Proposed Plan of Action recommends the establishment of mandatory competency and certification programs for the drilling and servicing sectors. Currently, certification is required only in certain exploration, drilling and service rig positions. The task force believes on-the-job training is more effective than added certification in ensuring high safety standards. In addition, the knowledge and experience necessary for the many jobs in the industry vary so widely with equipment, types of drilling and environmental conditions that certification would be impractical and nontransferable.

Improved training for supervisory personnel in particular would be of benefit because supervisors are the direct link between workers and senior management. Supervisors can help improve attitudes toward safety in the field where most accidents happen. In addition, on-the-job training and site orientations can cover all the site and task-specific concerns of a work site and prevent accidents on an ongoing basis.

SAFETY AWARDS

Recommendations 25 and 26

Individual companies and industry associations should assess the feasibility of developing safety award programs for their employees and members.

Background

One of the most effective ways to alter attitudes toward safety is to recognize and publicize safety achievements. This applies to all levels of employees and sizes of companies and becomes even more meaningful if those receiving recognition have had some input into the development of the recognition program.

RECOMMENDATIONS FOR SPECIFIC INDUSTRY SECTORS

DRILLING OPERATIONS

Recommendations 27 through 30 - Drilling Rig Operations

Rig inspections involving both operating company and contractor representatives should be done regularly and follow a standard safety inspection checklist. The checklist should be developed by industry associations from current ERCB, OH&S and CAODC inspection lists. The drilling sector should also introduce task observation and safety audit training programs for drilling supervisors and key personnel. As well, drilling contractors should implement on-the-job training programs.

Background

Rig inspection programs vary among drilling rig companies as do their standards, which makes them difficult to monitor industry-wide. Another concern is that operating companies are not always involved in the inspections.

Drilling activities were responsible for 71 percent of upstream petroleum industry accidents between 1980 and 1988 (see WCB statistics in Appendix B, page 56). Drilling work demands more physical exertion than most other industry work, and peaks in these activities cause drastic shifts in worker numbers. Formal training in this area is hampered by constant overtime and a transient workforce. Increased availability of training, especially on-the-job training, would help improve the drilling sector's accident rate.

Recommendations 31 and 32 - Service Rig Operations

Minimum qualification and training standards should be developed for service rig

personnel. In addition, service rig contractors should implement on-the-job training programs.

Background

In addition to training and experience standards required as part of current government certifications, industry should develop its own standards to ensure service rig personnel are qualified to work safely. On-the-job training programs are needed for service rig personnel because their work is as potentially hazardous as drilling and hampered by similar difficulties.

EXPLORATION

Recommendation 33

The Canadian Association of Geophysical Contractors (CAGC) should expand its training programs for seismic workers to include training in safe work practices. This training should include proper work area preparation, lifting and pulling techniques and methods for preventing injuries.

Background

Most injuries in geophysical activities occur due to work in the rough outdoor environment. Many injuries are strains, bruising and sprains due to work on slopes and uneven terrain in seismic operations. Although many of these injuries are minor, each one results in work slow-downs.

FIELD CONSTRUCTION

Recommendation 34

The task force recommends industry and government work together to develop training courses specific to field construction training.

Background

Neither industry nor government currently offers adequate training specific to upstream petroleum field construction.

TRANSPORTATION

Recommendation 35 - Pipeline Operations

An industry joint committee made up of representatives from SEPAC, CPA and IPAC should develop specific standards for safe work procedures on pipeline operations and training programs for pipeline companies.

Background

The establishment of specific work standards by these industry associations would be effective in improving work performance within the pipeline industry. The associations should also organize the training programs on pipeline operations because many companies are too small to do this on their own.

Recommendations 36 through 38 - Oilfield Trucking

These recommendations are concerned with the hauling of equipment and materials used in drilling, well servicing, construction and production operations in the field.

An Oilfield Trucking Association (OTA) should be formed with a mandate to develop and promote minimum safety and operational standards. The new associa-

tion should develop minimum training standards for the various jobs within oilfield trucking and promote safety through training programs. It should also work to improve work planning among oilfield truckers in order to level their workloads.

Background

A new association, OTA, has been introduced by PSAC and must receive support from government and other industry associations. The association must develop methods to monitor and improve safety performance among oilfield truckers, particularly during peak periods when inadequately experienced personnel are sometimes used. The trucking industry must also improve the qualifications of new drivers beyond hands-on training, which is currently the most common form of training.

Recommendations 39 through 42 - Production Fluids Trucking

The following recommendations are concerned with the hauling of fluids resulting from oil and gas production and recovery operations in the field.

All trucking associations, including the newly formed OTA, should expand membership to include production fluids truckers and should promote safety to their members. The upstream petroleum industry, through various industry associations, should develop a code of practice for trucking and promote it to member trucking companies. The trucking industry should also adopt and enforce the OH&S safety guidelines for handling and transporting bulk sour products. All companies hauling production fluids must have spark arresters and positive-air-shutoff equipment on their diesel-driven equipment used for hauling production fluids.

Background

Within the trucking industry, greater communication is needed among the various trucking operations. Through coordinated efforts, this sector of the industry can significantly improve its safety performance. The adoption of an industry-wide code of practice for trucking production fluids would provide consistent policies, standards and procedures.

Because of the hazards of hauling sour products, industry needs to ensure its drivers are properly qualified as required by OH&S guidelines. In addition, the OH&S Act requires that diesel-driven equipment working in certain hazardous areas be equipped with spark arresters and positive air shutoffs.

SAFETY PAYS

Safety does pay. Safety measures promote productivity, good morale and a team approach to preventing accidents. A positive approach to safety, including training programs, preventive maintenance and safety policies, helps prevent accidents and proves company commitment to the safety of its workers.

As well as these benefits, companies actively promoting safety have a more acceptable image because they are recognizing people as their greatest resource. Workers and society as a whole, are unwilling to accept anything less and are demanding extensive measures to prevent accidents.

On the financial side, safety programs save money and maximize production. In fact, in today's competitive business world where every dollar must be spent wisely, there is no choice than to make safety a high priority. Safety programs cost much less than accidents.

DIRECT COSTS OF INDUSTRIAL ACCIDENTS

Direct costs of accidents, those that can be quantified, include high WCB assessments (based on accident frequencies), high insurance premiums, legal fees for possible court action, and government fines, if legislation is violated. Information on WCB costs and government fines is publicly available and is presented here as examples of the high costs of poor safety performance.

WORKERS' COMPENSATION BOARD

In 1987, the WCB assessed $8.7 million for accidents in the upstream petroleum industry, all of which is paid by industry through their annual WCB assessments. Worse yet, the costs of compensating accident victims are increasing: Alberta WCB's discussion paper, Shaping the Future, states that costs per claim, when measured in constant dollars, almost tripled for all Alberta industries between 1966 and 1986. Industry contributions to the WCB have not been able to keep up with claim costs and have left an unfunded liability of $360.7 million in 1987, up from $114 million in 1984. In order to slow the growth of the unfunded liability, the board raised its assessment rates for 1989, causing many upstream petroleum companies to face increases in assessments of 12 to 25 percent.

The impact of these WCB assessments on individual companies is exemplified in Figure 3. The WCB establishes base rates for different types of operations and then, based on safety performance, increases or decreases the rates for individual companies by an experience rating factor. This factor can be as much as 40 percent.

Type of Company	Annual Payroll	Base Rate (per $100 payroll)	WCB Annual Assessments			
			Base Payment	Payment with 40% Penalty	Payment with 40% Reward	Difference Between 40% Penalty & Reward
Servicing company	$ 1 000 000	$10.06	$100 600	$140 840	$ 60 360	$ 80 480
Seismic/geophysical company	$ 10 000 000	$ 4.11	$411 000	$575 400	$246 600	$328 800
Operating company	$100 000 000	$ 0.34	$340 000	$476 000	$204 000	$272 000

These costs are sizeable, but they can be reduced if industry places a greater emphasis on safety.

FINES

Companies that violate OH&S regulations, face fines under the act and possibly under other legislation, such as transportation of dangerous goods regulations or ERCB regulations. OH&S fines have recently been increased from $15 000 to $150 000 for first offenses and from $30 000 to $300 000 for second offenses. These increases place Alberta's fines 600 percent above Ontario's, which were formerly the highest. Monetary fines can also be accompanied by jail terms ranging from six to 12 months.

Transportation of dangerous goods fines range from $50 000 to $100 000 and ERCB fines range from $300 to $1 000 plus daily fines of $100 to $500 for continued offenses.

INDIRECT COSTS OF INDUSTRIAL ACCIDENTS

As well as the direct costs of accidents, there are many indirect costs. These costs are often overlooked because they are not readily apparent at the time of an accident. For every dollar spent on direct accident costs, an estimated two to four more are lost in indirect costs such as those listed below:

- lost production
- tarnished image
- lost business due to failure to fill orders
- low morale, which leads to higher staff turnover
- lost worker productivity
- hiring and training time, which often result in production slow-downs
- overtime
- salaries of convalescing and replacement workers

SAFETY MAKES SENSE

Everyone in the industry, from top-level executives to entry-level workers must share a greater concern for safety. Maintaining a safe workplace is as important as keeping up with technology and competition.

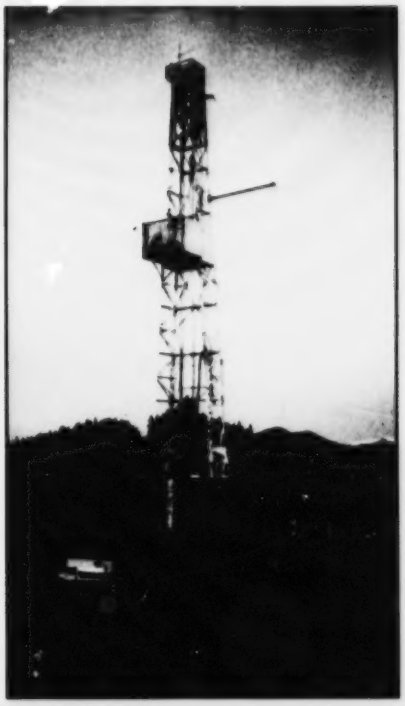
The commitment takes time, effort and money on an industry-wide basis, but it has a tremendous payoff in reduced human suffering for workers and their families and improved bottom-line profits for the industry. SAFETY DOES PAY.

RECOMMENDATIONS FOR INDUSTRY AND GOVERNMENT

This section of the report contains 26 recommendations that apply to most areas of the upstream petroleum industry and to government. The task force prepared these recommendations after studying 13 key areas identified as having impact on safety (see Introduction on page 1 for a list of these areas).

From these studies, many factors were found to play a contributing role to safety performance within the upstream petroleum industry:

- hazardous work environments
- inadequate commitment to safety by industry
- poor statistical information for analyzing accident trends and providing direction for improvements
- fluctuating levels of work activity, caused by changes in economic conditions, government incentives and environmental conditions
- the transient nature of the work force due to the hazardous work and undesirable work conditions, especially in winter
- the loss of trained and skilled personnel through layoffs and movement to other industries during economic downturns
- reductions in government occupational health and safety spending on training and inspections
- inadequately qualified work site supervisors and workers



The recommendations for safety improvements resulting from these investigations are grouped under the following headings:

- Minimum Basic Safety Program
- Bidding Procedures and Contracting Terms
- Industry Safety Implementation Committee
- Accident Reporting
- Drilling and Servicing Cycle
- Inspections and Regulations
- Funding Cutbacks in Government Services
- Work Site Supervision
- Certification and Training
- Safety Awards

One of the recommendations, Recommendation 3 (page 19), is key to the success of all other recommendations in the report. It proposes an Industry Safety Implementation Committee for monitoring the implementation of the report recommendations. This committee will ensure the work started with this task force to improve safety will continue in both government and industry.

MINIMUM BASIC SAFETY PROGRAM

RECOMMENDATION 1: Basic Safety Program to be an OH&S-Regulated Requirement for All Companies

A basic safety program, with a minimum of six components, should be a regulated requirement for all operating companies and contractors within the upstream petroleum industry. Those six components should be as follows:

A. Management Commitment and Involvement

B. Hazard Assessment and Control

C. Rules and Work Procedures

D. Training and Motivation

E. Communication and Group Meetings

F. Accident Investigation and Analysis

Action Plan

a) The Alberta government should revise its regulations to the OH&S Act to require all companies operating within the upstream petroleum industry have a basic safety program with the minimum components described above.

b) These regulations should be enforced through random audits by OH&S. OH&S inspectors would look for a written safety program and for records kept as part of the program such as training records, minutes of safety meetings, inspection reports, accident reports and internal company safety audits.

c) The task force has provided in this report a basic safety program designed to satisfy the minimum requirements of this recommendation (see Appendix E, page 71). The five industry associations should make this program available to their members, and individual companies should adapt this program to their specific operations.

d) All companies should either audit their safety programs themselves or arrange for external audits by qualified safety professionals. Audits should be kept on file for five years.

Background

The task force feels very strongly that good safety programs change attitudes and improve safety. In fact, according to the Du Pont Resource Guide to Safety Services, safety programs have helped many companies, including Du Pont, reduce accidents by 50 to 70 percent within two years. Every company must have a program that promotes safety awareness and ensures all petroleum industry operations are carried out safely. The task force feels a revision to the regulations is the only way to achieve this.

A good safety program is a means by which management can correct substandard practices, conditions and attitudes, thereby reducing accidents. It sets standards for training, communications, inspections, accident investigations and safe work procedures.

The six components of the recommended minimum safety program and the various activities that comprise the components are described in detail in Appendix E. Appendix E also contains a sample safety program. This program will give those companies without safety programs a basic standard to follow in setting up their own programs.

Other suitable programs are available from some of the industry associations, various commercial and safety organizations, and safety consultants.

BIDDING PROCEDURES AND CONTRACTING TERMS

RECOMMENDATION 2: Contracting Terms to Include Safety Requirements

All petroleum-industry bid documents and contracts should contain a section on safety, detailing the operating companies', contractors' and subcontractors' safety specifications, requirements and guidelines.

To ensure safety is a consideration in the awarding of contracts, operating companies and contractors should require the following information in their bid requests:

a) a copy of the contractor's or subcontractor's safety program and policy

b) WCB and OH&S statistics and ERCB reports on the contracting company

c) copies of the latest equipment standards and inspections required by law, and copies of the pertinent industry association's standards, if applicable

d) proof that payments of WCB assessments are up to date

e) statement of compliance with all federal, provincial and local legislation (Workplace Hazardous Materials Information System, transportation of dangerous goods legislation, OH&S Act and regulations, WCB acts and regulations and ERCB regulations)

f) the name of the designated safety person for the work site

g) copies of the contractor's procedures for hazardous work

Operating companies should give significant consideration to a contractor's past safety record when evaluating contract bids. All other factors being equal, a contractor with a better safety record, or one taking significant measures to improve his safety record, should be awarded contracts over others.

As well as giving credit for good safety performance, operating companies should recognize a contractor's membership in an industry association.

Action Plan

A company that is contracting services within the petroleum industry should:

a) in the bidding process, request safety information from bidding contractors

b) in the selection process, strongly consider demonstrated safety experience and membership in industry associations such as PSAC and CAODC

c) within its contracts, specify safety requirements as a separate section

d) on the job site, provide leadership in safe work practices to their employees and contractors and employ supervisors knowledgeable in safety requirements and objectives

e) upon completion of the contract, include safety considerations in the evaluation of contractor performance

Background

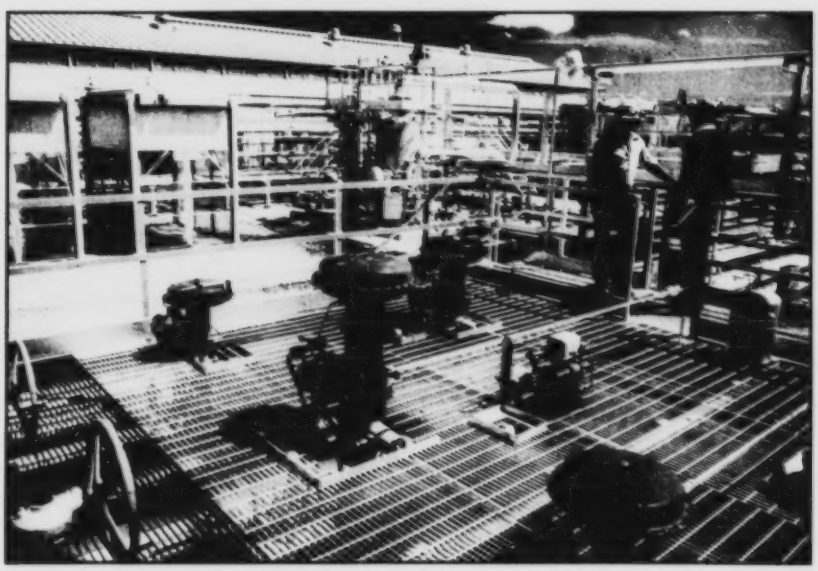
Currently, bidding procedures and contractual safety requirements vary widely among operating companies from one-paragraph statements to full detailed safety specifications. Most major companies attempt to address safety in contracts, but many smaller ones do not.

Some contractors are not paying sufficient attention to equipment maintenance or replacement, or to safety considerations. These contractors are often working at or near cost in order to survive because economic downturns have drastically increased competition.

At the same time, other contractors, in spite of economic downturns, continue to work safely. These contractors should be preferentially supported with work. Evaluating safety performance and programs when awarding contracts would achieve this, and would work well for both the operating companies and contractor in the following ways:

- contractors who have good safety records and programs would be hired over those who do not
- to qualify for the bid list, contractors with poor accident records would be required to show steps they have taken or plan to take to improve their safety performance
- contractors and workers would have increased incentive to work safely to avoid contract violation
- a more skilled labour force would result as contractors would be more likely to retain and continue to train employees, and to view their training as an investment
- operating companies would benefit because their contractors would be less likely to have accidents
- oilfield accidents would be reduced

One part of this recommendation is recognition of a contractor's membership within an industry association. This is encouraged because of the equipment, operating and safety standards demanded by some associations as a condition of membership. Contractors who are members of these organizations are bound by these requirements.



RECOMMENDATION 3: Industry Associations to Form a Safety Implementation Committee

An Industry Safety Implementation Committee should be formed to monitor implementation of the recommendations of the task force and to monitor safety on an ongoing basis.

The committee would be comprised of:

- a member from each of the boards of CPA, SEPAC, IPAC, PSAC and CAODC
- the executive director of OH&S
- the chairperson of the ERCB
- the chairperson of each association's accident prevention committee or equivalent

The committee's responsibilities would be to:

- monitor the implementation and progress of the task force recommendations
- monitor and analyze industry accident statistics to determine the effect of task force recommendations
- address any common safety issues raised by either industry or government
- report directly to each association's board

Action Plan

a) Each of the five industry associations should designate a member of their board and the chairperson, or equivalent, of their accident prevention committee to be members of the proposed Industry Safety Implementation Committee by June, 1989.

b) These committee members should approach the executive director of OH&S and the chairperson of the ERCB to be members of the committee.

c) The committee should prepare its terms of reference and work plan. The plan should include studying the task force recommendations and developing methods and steps to help the industry implement them.

d) The committee should report twice a year on their activities and progress to the respective boards.

Background

The recommendations made by this task force must be implemented and monitored in order for government and industry to realize their goal of reducing accidents in the upstream petroleum industry.

Lack of a method to ensure recommendations were implemented was one of the downfalls of the 1979 report Safety in the Oil Fields, published by the SAGE Institute (Edmonton) Ltd. for the OH&S Division of the Alberta government. The report contains many good recommendations, some of which are still applicable today; however, neither government nor industry was held accountable for implementing or complying with the recommendations, and neither had a mechanism for monitoring any resulting action. Thus, there was only limited action taken on a number of the report's recommendations.

An Industry Safety Implementation Committee could help ensure the task force recommendations are enacted, and could provide advice on the best approaches to take.

RECOMMENDATION 4: Industry to Review Concept of Safety Association

The proposed Industry Safety Implementation Committee should assess the feasibility of forming an industry safety association within three years' time.

The association could have broad responsibilities in all areas of safety, including:

- education and training
- information and statistics
- regulatory review and liaison
- consulting and programming services
- public relations
- improved equipment safety
- special awards and competitions
- annual conferences

Action Plan

The proposed Industry Safety Implementation Committee should evaluate within three years the merit and feasibility of an industry safety association.

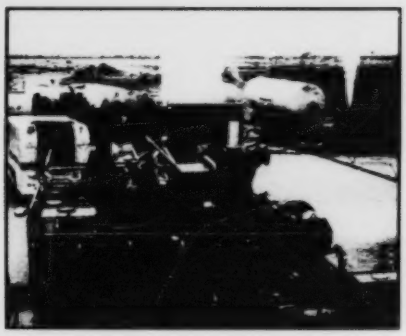
Background

A safety association would provide a coordinated way to manage the safety needs of the upstream petroleum industry. A safety association would also reduce the workload on industry associations.

The association could be directed by the boards of the various industry associations and be run by full-time professional safety staff. A portion of WCB assessments could be used to fund the administration of the association.

After extensive discussion by the task force, however, it was decided not to recommend formation of an industry safety association at this time. Despite the advantages of such an association, the task force members felt it would be advisable to first evaluate the effectiveness of the proposed Industry Safety Implementation Committee. It was also felt the existing associations could effectively coordinate their activities in the formative stages of implementing recommendations without going to the expense of an industry safety association. This could be done through the recommended safety implementation committee representing the five associations, the ERCB and the Alberta government.

The task force recommends the concept of an industry safety association be evaluated within three years.



ACCIDENT REPORTING

RECOMMENDATION 5: OH&S and Petroleum Industry to Improve

Accident Reporting to WCB

The WCB, OH&S and industry associations must work together to improve accident reporting to the WCB in order to have available complete and detailed industry accident statistics.

This group should design a new WCB accident report form that requires more details than the present form. The type of accident information the WCB should require industry to report is:

- time, date and place of accident (e.g., which lease or plant)
- name of owner/operating company
- name of company employing worker
- whether accident occurred on petroleum industry property
- type of accident
- severity class of accident
- cause of accident
- nature of working conditions
- age of injured person
- experience of injured person
- special circumstances
- cost of accident

The WCB and industry should also define the WCB classes needed to adequately represent the various sectors of the petroleum industry.

Action Plan

a) Industry associations, through the proposed Industry Safety Implementation Committee, should work with the WCB and OH&S to prepare a new accident report form that will address the needs of both government and industry.

b) The WCB should introduce the form, with the cooperation of industry.

c) The WCB and industry should work together to create classes specifically for each sector of the upstream petroleum industry.

Background

Complete, comprehensive and timely accident statistics are essential to monitor, analyze and reduce accidents in the petroleum industry. Much of the information requested in this recommendation is now not available from government.

Specific classes for each of the various sectors of the petroleum industry are recommended to allow industry to determine where accidents are occurring. For example, the current trucking categories are Heavy Industrial Trucking and Trucking by Tanker. These categories represent all truckers (highway, logging, hauling or refined product, etc.), not just oilfield truckers.

RECOMMENDATION 6: Government to Make Accident Statistics Easily Available

The WCB should maintain a data base of all fatalities, lost time accidents and actual hours worked per month, by industry classification, and should make this information available in various formats by computer on a timely basis. All the information outlined in Recommendation 5 should be included in the data base for each accident.

Action Plan

a) The proposed Industry Safety Implementation Committee should assign personnel to work with the government to design the necessary computer software program. This program would be set up to analyze accident statistics and produce reports that would show overall industry safety trends and performance as well as specific safety problems in the industry.

b) Government should implement the computer system by the end of 1989 and publicize its availability to industry.

Background

The industry must have meaningful and accurate accident statistics readily available to them, so individual operating companies, contractors, and industry associations can monitor safety performance. At present, only the numbers of occurrences of lost time claims and fatalities are available from the WCB. To determine the reasons for accidents and where accident prevention efforts are needed, more complete information is needed such as the experience of the worker and the sector of the industry where the accident occurred.

Other necessary information is the actual hours worked per month by industry classification. Accurate numbers of hours worked are needed to calculate accident frequencies, which are a truer and more meaningful indicator of safety performance than the number of occurrences.

Computerization of all accident information is recommended to make the generation of reports easier and expeditious.

RECOMMENDATION 7: Industry and Government to Use Standard Formulas to Calculate Accident Frequencies

Provincial worker compensation boards and industry should all use the formula shown below for calculating accident frequency and should adjust the frequency for accident severity by the severity index also shown below.

$$\text{LTA accident frequency} = \frac{\text{LTA} \times 200\,000 \text{ hours}}{\text{exposure hours}}$$

$$\text{Severity index} = \frac{\text{compensable days}}{\text{LTA} \times 30}$$

Where:

LTA	=	number of lost time accidents
Exposure hours	=	total number of hours worked in the company
Compensable days	=	number of work days lost as a result of the LTA, as established by WCB
30 days	=	the average number of compensable days per LTA, as established by WCB

A fatality should be considered as 6 000 work days or 48 000 work hours.

Action Plan

a) Provincial workers' compensation boards should use the above formulas for calculating accident frequencies and severities.

b) The WCB in Alberta should take the lead in establishing national standard criteria for reporting accident frequency. It should approach Saskatchewan

and British Columbia to discuss standardizing accident frequency and severity calculations.

c) Industry associations should promote the use of these indices to their members.

Background

Accident reporting methods vary within the petroleum industry. Some companies base their statistics on 200 000 work hours, others on 1 000 000 work hours. To ensure consistency among all segments of the industry and for comparison with companies in other industries, accident frequencies should be based on 200 000 work hours. This is equal to 100 workers working an average of 8 hours/day for 250 days of the year. The base of 100 workers is used to facilitate easy calculation of the total percentage of injured workers — for example, five lost time accidents are equal to five percent of the work force.

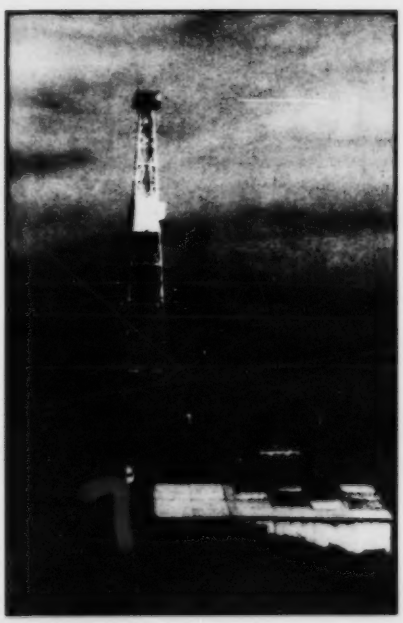
Severity as well as accident frequency should be reported because accident frequency alone does not give an indication of the seriousness of accidents.

DRILLING AND SERVICING CYCLE

RECOMMENDATION 8: Government and Industry to Improve Annual Drilling Cycle

Government and industry should take steps to level the highs and lows of operating activity in the petroleum industry. The following actions are recommended:

- government incentive programs should be revised to minimize the "end-of-incentive rush," which makes the safety of drilling and support operations such as service rigs, lease construction, and trucking, more difficult to maintain
- industry should encourage early planning for exploration and development work to level the workload and provide contractors with longer term contracts



Action Plan

a) When the government is designing incentive programs, it should consider ways to reduce the severity of end-of-program peaks.

b) Industry should consider early scheduling of exploration and development work to smooth the peaks of drilling activity over the normal drilling cycle of the year. This would allow for extended contracts with contractors, which should reduce their worker turnover.

c) The three operator associations (CPA, IPAC and SEPAC) should develop an educational program for their member companies, outlining the financial benefits of multi-well drilling contracts and load levelling of drilling activity.

Background

The increase in accidents during periods of peak activity is due to a lack of adequately experienced personnel and to the excessive work hours imposed on supervisors and workers. In addition, many workers are physically inactive over the relatively long periods between drilling seasons and are more vulnerable to accidents upon their return to work.

Factors that affect activity levels include:

- winter peaks due to the need to access some land on frozen ground and lows in the spring due to road bans
- random peaks due to government incentive programs and major activity lows once the programs end

Historically, the drilling industry has been able to accommodate and adapt to the traditional winter peaks by utilizing a seasonal labour force (generally farmers who work the rigs only in the winter); however, incentive programs have tended to accentuate these peaks. While recognizing the competitive nature of the industry and the effect of land sales and environmental conditions on drilling activity levels, the task force feels better planning by the government and the industry in general could spread the drilling more evenly over the traditional season.

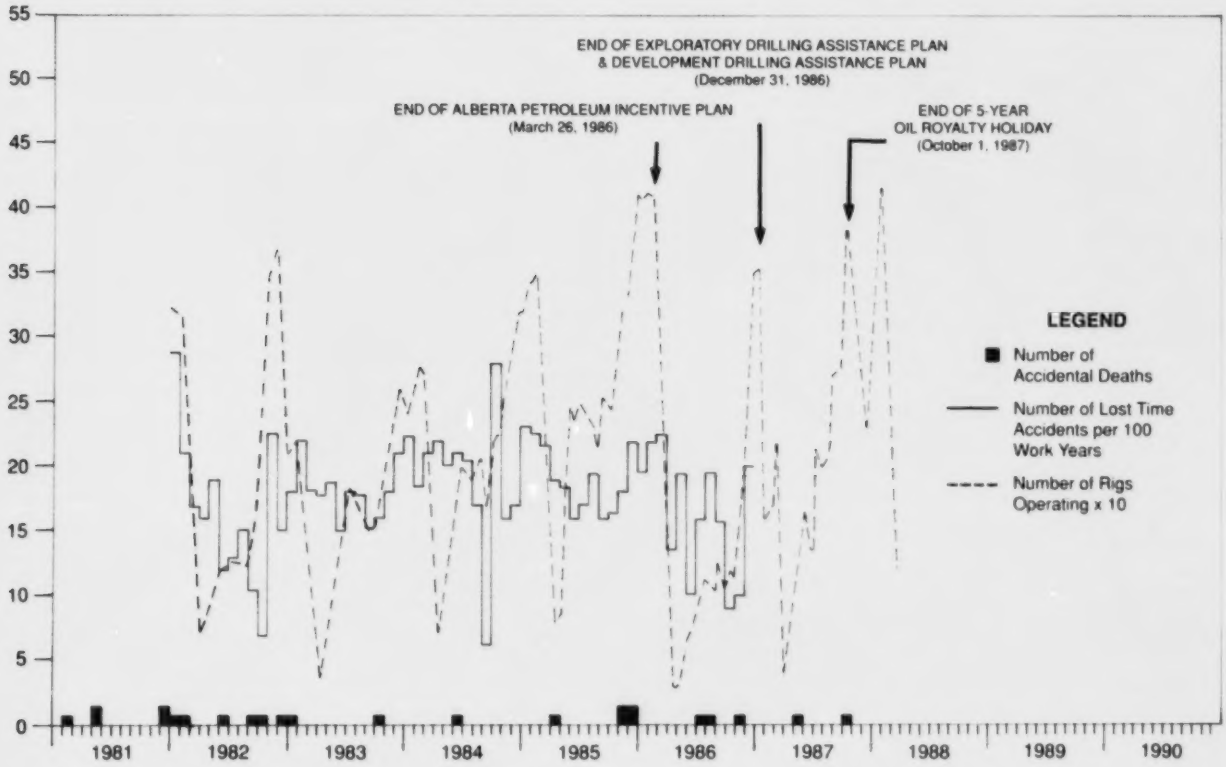


FIGURE 3: Numbers of Drilling Fatalities, Lost Time Accidents and Rigs, 1981 to 1988

Figure 3 compares the numbers of fatalities and lost time accidents with rig activity in the drilling and servicing industry. The end of several incentive programs is also indicated. Although there is not a high correlation between peak activity levels and high LTA frequency rates, the task force is convinced factors such as inexperience, fitness of workers, and longer work hours tend to increase accident rates during these periods.

A stable experienced labour force, obtained by attracting, training and keeping good people is essential to maintaining safer operations. To do this, the industry needs to be able to offer steady work. It makes good sense from both business and safety points of view to level activity rates as much as possible.

RECOMMENDATION 9: OH&S to Employ Experienced Petroleum Industry Persons as Inspectors

To ensure inspections are carried out competently, OH&S inspectors assigned to the petroleum industry must have petroleum industry experience.

Action Plan

a) The government should hire persons as OH&S inspectors who have experience in oil and gas drilling, operations or facility construction.

b) For current inspection staff, government and industry should develop a training program that would include hands-on operating experience.

Background

Only a few OH&S inspectors are fully conversant with all aspects of the petroleum industry and familiar with all petroleum industry procedures. Post-secondary education alone is not enough to provide a good understanding of the industry, and inspector training upon hiring is only minimal. Experience within the petroleum industry is necessary for inspectors to be able to adequately perform their inspections.

RECOMMENDATION 10: Government to Coordinate Their Inspections

Government departments should coordinate their inspections where there is potential for overlap or conflict or where mandates are related in order to:

- avoid wasting both government and industry time
- ensure thorough coverage of both equipment and worker safety
- eliminate conflicting instructions
- improve inspections through shared knowledge among departments

Some of these government departments include OH&S, ERCB, Boilers Branch, Electrical Protection Branch, Apprenticeship Board, Alberta Forest Service, Alberta Labour, and Alberta Public Safety Services.

Action Plan

Senior management of the government departments involved should endeavour to coordinate government inspections. Coordination should be phased in within twelve to eighteen months.

Background

Work sites and various types of work are inspected at different times by multiple departments and branches of government. For example, at various times during the construction of an oil and gas facility, ERCB, Boilers Branch, Electrical Protection Branch, Apprenticeship Board, and OH&S all conduct their inspections independently of each other. At drilling and servicing locations, the operating company's well site supervisor and the contract rig manager can have, within the space of only a few hours, two separate inspectors visit the rig site. This can be disconcerting, and may in some areas of inspection, be redundant. For example, they may both check for personal protective equipment such as hard hats or flame-retardant clothing.

ERCB and OH&S have already done some work on coordinating their inspections. This initiative is applauded and should be pursued further.

Different government departments should also be aware of each other's regulations and activities to avoid conflicts or confusion. An example of this is designation of H_2S hazard areas. Many industry people think OH&S and ERCB base their hazard designations on the same H_2S measurements, but they do not. OH&S designates H_2S hazard areas based on "occupational exposure limits," which are the H_2S concentrations a worker can withstand for specified work periods (e.g., exposure to 10 ppm H_2S for greater than eight hours is considered hazardous), whereas ERCB designates H_2S hazard areas based on "shut-down limits" (e.g., one percent (10 000 ppm) H_2S or more is considered to be hazardous). In related matters such as these, government departments should make a point of explaining their regulations and their relationship to similar regulations of other departments.

It is reasonable to expect all government agencies to work closer together, to cross "boundaries" if necessary, and so make inspections more effective. This one-stop shopping concept would be very useful to industry.

RECOMMENDATION 11: Companies with Poor Safety Records to be Assisted and Inspected More Often

OH&S and ERCB should more frequently inspect operating companies and contractors with poor safety records.

OH&S should also assist companies in improving their safety records and shut down companies that do not conduct audits or attempt to improve their safety procedures where necessary.

Action Plan

OH&S and ERCB should:

- keep an ongoing list of companies whose safety records are below industry average, and monitor safety records using the standard calculations in Recommendation 7
- conduct additional inspections of those companies to observe work procedures and find problem areas relating to worker safety
- record observations of field work and accidents on their safety reports, and include information on the cause and prevention of accidents
- in the absence of audits or demonstrated improvements, shut down companies with poor safety performance

Background

The industry accident rate could be lowered effectively if OH&S and ERCB were more proactive and concentrated their safety inspections on operating companies and contractors with safety records below the industry average.

RECOMMENDATION 12: OH&S Inspectors to Provide More Leadership in Accident Prevention

OH&S inspectors should take a proactive role and provide leadership and consultation in accident prevention. This should be part of their routine inspections.

Action Plan

Within all sectors of the upstream petroleum industry, OH&S inspectors should:

- broaden the scope of their inspections to include audits of safety programs and procedures

- advise on work methods to improve safety and minimize the potentially dangerous consequences of ignoring required safety standards
- during inspections, ensure workers understand the regulations

Background

OH&S inspectors now inspect mainly when there are accidents and to check on compliance with regulations. The intention of OH&S inspections should be to improve and ensure safety, not just to find fault. Inspectors could be more effective by providing leadership and consultation on preventing accidents. They could assist in monitoring safety program effectiveness and could advise on regulatory matters to ensure compliance. A cooperative relationship with contractor and operating company representatives will provide the best results.

Several task force subcommittees reported there are not enough inspectors. They commented that, because of this, inspectors have time only for responding to problems, not for taking a proactive role in accident prevention. OH&S should examine the number and competency of their inspectors.

RECOMMENDATION 13: Alberta OH&S Statute and Regulations Manual to be Revised

The Alberta Occupational Health and Safety Statute and Regulations should be rewritten in a user-friendly format.

Action Plan

OH&S should change the format of the Occupational Health and Safety Statute and Regulations to make it easy to use and understand. Some recommended changes are:

- improve indexing
- make wording more concise
- group related information to avoid the need to search for details
- improve cross-referencing

Background

In the current regulations, different steps of one task are sometimes covered in separate sections of the regulations or the act, or may appear in both. Wording is often ambiguous, vague and, in some cases, impractical.

FUNDING CUTBACKS IN GOVERNMENT SERVICES

RECOMMENDATION 14: Privatization of Government Inspections to be Examined

The provincial government's transfer of some types of inspections to the private sector should be examined to ensure high standards are being maintained.

Action Plan

a) Government should discuss with the proposed Industry Safety Implementation Committee any proposed cutbacks and privatization initiatives in both the General Safety Services Division, Alberta Labour, and in OH&S.

b) The provincial government should assess safety implications thoroughly before transferring any inspection functions to the private sector.

Background

An article in the October 28, 1988, edition of the Calgary Herald states that during the past four years, OH&S lost $3.5 million of its $12.2 million budget and almost 60 full-time staff. A different article in the same edition quotes from an OH&S report: "The occupational health and safety division is severely short-staffed, and thus cannot inspect sites on a routine basis."

Some of the inspections historically provided by the government are being turned over to the private sector. One of these is the retesting of pressure welding, which used to be done by the Boilers Branch. The industry is concerned this privatization may affect standardized inspection procedures, which could reduce the safety of facilities or operations within the oil and gas industry.

It is hoped government departments will discuss with industry any proposed cutbacks and privatization initiatives that may affect industry operations.

RECOMMENDATION 15: OH&S to Fund and Conduct More OH&S Training Seminars

OH&S should take a more proactive role in training by funding more OH&S training seminars for the petroleum industry.

Action Plan

a) Industry should meet with OH&S to discuss training OH&S can provide.

b) OH&S should organize and advertise more training seminars for the petroleum industry, including seminars that present OH&S legislation.

c) Industry should increase its use of the Petroleum Industry Training Service (PITS).

Background

An original mandate of OH&S was to do a substantial amount of training. Fewer OH&S training seminars specific to upstream petroleum industry needs are now offered than in previous years, and some areas of training are being conducted by private training companies. For example, the Accident Control Course for Supervisors, Confined Space Entry and Joint Work Site Health and Safety Committee Course are no longer offered by OH&S.

An article in the Calgary Herald (October 28, 1988) states government budget cutbacks have virtually wiped out research and education programs within OH&S. The task force feels training is an important means of significantly reducing accidents and recommends more funds be allocated for this purpose. Historically, OH&S courses have been very effective.

One area where OH&S should take a much more active role is training industry members in their regulations. They should conduct more seminars on this subject as a large segment of the industry does not know or clearly understand parts of the legislation.

Where OH&S is unable to increase their services, they should more actively advertise the services they do have to offer, such as providing instructor and course information, course design consultations, posters and publications, books, videos and films.

RECOMMENDATION 16: OH&S to Make Safety Publications More Available

OH&S must make copies of their own regulations and safety and procedures publications more available.

Action Plan

OH&S must increase the availability of safety publications related to the upstream petroleum industry.

Background

OH&S publications on safety used to be readily available, but now it appears due to the expense of printing, very few copies are provided. For example, the excellent publication Standard Procedure for Drillstem Testing is no longer available.

RECOMMENDATION 17: OH&S to Verify Qualifications of Training Companies Before Providing Their Names to Industry

Before supplying industry with the names of trainers and training companies, OH&S should ensure instructors are competent and programs meet industry and government safety requirements and standards.

Action Plan

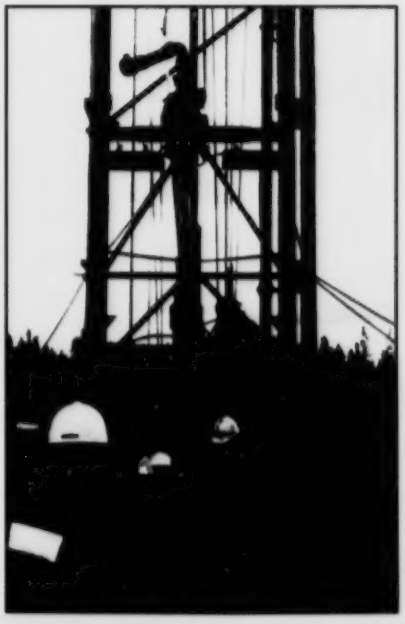
a) OH&S should verify the competency and qualifications of training company instructors, and the quality of course content, for the training companies on their list.

b) OH&S should provide names of only those companies whose instructors and courses meet industry and government standards.

Background

OH&S maintains a list of trainers and companies that provide training courses and makes it available to industry without first checking the quality of courses and instructors. As a result, some substandard training has been offered.

WORK SITE SUPERVISION



RECOMMENDATION 18: Qualifications of Operating Companies' Work Site Representatives to be Improved

Operating companies must improve qualifications and experience of their work site representatives, whether they are employees of operating companies, consultants or contractors, and must ensure representatives understand OH&S regulations, are competent in the tasks performed, and have safety training.

Action Plan

a) All operating companies should work with their industry associations to develop standard training, safety and experience levels for work site supervisors.

b) All operating companies should hire only work site supervisors with adequate training and qualifications, as specified by their appropriate industry associations. This applies to the operating company's own employees, consultants and contract work site representatives.

Background

Many accidents occur due to poor work direction and lack of experience and knowledge of site supervisors. Operating companies should assume the responsibility for ensuring their work site representatives are adequately trained, competent in the work, and understand OH&S regulations. Work site supervisors, both direct employees of an operating company, consultants or contractors to an

operating company, must have a specified standard level of training and experience pertinent to the type of work for which they are responsible. They must also be fully trained in safety and inspection procedures.

RECOMMENDATION 19: Operating Companies' Representatives to be Qualified and On Site for Downhole Operations

Operating companies must ensure, during any type of downhole operations, their well site supervisors are on site, have a specified level of experience, and possess Level II well control certification. This applies whether the supervisors are employees, consultants or contractors.

Action Plan

a) All operating companies must develop standard training and experience levels for well site supervisors. This can be done through their industry associations and in conjunction with the proposed Well Site Supervisors' Association. The qualifications specified in this recommendation can be used as a reference.

b) All operating companies should hire only well site supervisors with Level II well control certification and the specified training and experience.

c) All operating companies must have a qualified well site representative, whether an employee, consultant or contractor, on site during any operations related to the wellbore.

Background

Operating companies must ensure their well site representatives or supervisors have a standard level of training and experience. Service rig and servicing accidents have been observed that were the direct result of well site supervisors allowing poor practices and occasionally directing a crew to perform an unsafe procedure. This is generally due to a lack of understanding of risks associated with compromising safe practices.

Well site representatives are currently required to have Level II well control certification and must be on site only when a drilling or servicing rig is on site (see the glossary on page 49 for a description of both Level I and Level II well control training). This creates potential for unsafe situations when service companies are contracted to do work on leases without a rig.

Well control certification alone does not guarantee a well site supervisor has adequate safety training or experience to ensure work is done safely. Because of this, standard experience and qualification levels must be specified for well site supervisors.

The task force identified specific areas where training in addition to Level II well control is needed. For example, when service companies are working at a site, the operating company's representative should be familiar with perforating, acidizing, well stimulation and all other service functions, as required of a fully trained service rig consultant.

Operating company well site supervisors should have the following minimum training and experience:

- full knowledge of all safety procedures and equipment
- full understanding of all subordinate positions on the rig
- advanced supervisory training
- familiarity with all equipment and materials

- seminars or courses of study on ERCB and OHS regulations
- recognized certificates for first aid, H_2S awareness and well control

In addition to the above, well site supervisors on drilling rigs would need technical training such as:

- training in drilling fluids
- drilling tools training
- running of casing
- on-the-job experience with drilling fluids, coring, cementing and drill string programs

Well site supervisors on service rigs must also have substantial on-site workover and completion experience under the direct supervision of an experienced well site supervisor.

Well site representatives are also encouraged to obtain membership in an industry association such as CAODC or PSAC; or in a professional organization such as Alberta Society of Engineering Technologists; Canadian Association of Drilling Engineers; or Association of Professional Engineers, Geologists and Geophysicists of Alberta.

The Drilling and Completions Committee is currently outlining the training requirements for well site supervisors engaged in the drilling of critical sour wells.

Adequate training and experience levels for all operating company representatives on well sites must be specified and followed to correct deficiencies and improve safety.

RECOMMENDATION 20: Well Site Supervisor Consultants (Owners' Representatives) to Form a Well Site Supervisors' Association

Well site supervisor consultants and consulting firms that supply well site supervisors (for owners' representatives) should form an association to develop minimum safety standards for well site supervisory training, qualifications and procedures.

Well site supervisors who are operating company employees could also join the association as they have a similar need to be well-trained to ensure safe operations at well sites.

Action Plan

a) This new association should work with operating companies, through their industry associations, to develop minimum training and experience standards for well site supervision.

b) The association should coordinate appropriate training for supervisors through industry training facilities.

c) The association should also ensure new consultants receive on-the-job training from experienced supervisors.

Background

Experience levels and areas of specialization vary greatly among oilfield consulting firms involved primarily in well site supervision. Some firms concentrate mostly on well servicing while others offer a broad range of services. Although well site supervisors on drilling rig and service rig operations must have Level II well control certification, there are many who lack adequate safety training and experience.

The proposed Well Site Supervisors' Association would have as its mandate the development of minimum standards for well site supervision. These standards would be considerably more demanding than just Level II well control certification and would include training and experience requirements for the various jobs to be supervised. For example, a person supervising a service rig would require a background in perforating, acidizing, well stimulation, and all other service operations. More details are given in the background section of Recommendation 19.

Many accidents within the servicing industry are the result of operating company contract personnel who are unable to properly assess hazardous conditions and ensure safe practices are used. The proposed Well Site Supervisors' Association would work toward upgrading industry safety performance in these areas.

CERTIFICATION AND TRAINING

RECOMMENDATION 21: Industry Training Preferable to Government Certification

Certification in addition to that already required for upstream petroleum industry workers is unnecessary at this time. The best way to ensure safe work practices is through:

- competent supervisors
- safe work practices

- skills training and experience

Of these, work site safety can be improved most significantly through improving the technical, safety and interpersonal skills of supervisors.

Action Plan

a) Industry should establish minimum training standards for supervisors as outlined in Recommendation 22.

b) Recommendation 28, which recommends job/task observation training for drilling supervisors and other key personnel, should also be implemented. This system establishes, reviews and reinforces correct procedures for many tasks.

c) Industry should strongly support institutions (principally PITS, Northern Alberta Institute of Technology (NAIT) and Southern Alberta Institute of Technology (SAIT)) that provide knowledge, skill and safety training to the work force.

d) Operating companies should consider the level and training of contractor employees when awarding contracts (see Recommendation 2.)

Background

Industry is concerned government may view certification as an expedient solution to improving the knowledge and attitude of workers. This concern stems from the OH&S Action Plan, which states OH&S should:

> "Establish a mandatory competency/certification programme for two priority occupation areas in the Drilling and the Servicing sectors by September 1, 1989."

All sectors of the industry reviewed their areas to determine whether additional certification was necessary. The industry agreed throughout that further certification of workers is not the best way to improve safety performance. The certification already required for some drilling positions (Level I and Level II well control certification) for blasting (explosives handling certification), and for transporting dangerous goods (transportation of dangerous goods certification) is felt to be sufficient.

Another objection to further certification in the drilling and servicing sectors is that it would not be transferable from job to job. The knowledge and experience necessary to perform jobs varies so widely with equipment, types of drilling and even working conditions across the province, job-specific certification would be impractical.

The industry believes the most effective way to develop a competent, qualified and safe workforce and a safe work site is through three key areas: competent supervisors, safe work procedures, and skills training and experience.

RECOMMENDATION 22: Minimum Training Standards to be Established for Supervisors

All operating companies and contractors should establish a minimum level of safety training for their supervisory personnel.

Action Plan

Each industry sector should develop minimum training standards for supervisors. This safety training may be held in-house, or offered through institutions such as SAIT, NAIT or PITS.

Background

One of the most significant items affecting a successful safety program is the selection, training and development of supervisors. Supervisors, as members of a company's management team, are the direct link between management and on-site personnel. They are responsible for job training, development of good safety attitudes and identification and control of hazardous conditions and unsafe work practices.

Contractors and workers must expect a constant monitoring of their safety performance by supervisors who are dedicated to safety and totally conversant with their companies' safety and training programs.

RECOMMENDATION 23: Companies to Develop On-the-Job Training Programs

Each company should develop an on-the-job training program for its employees.

Action Plan

Each company should:

- determine all areas where training is required
- develop standards for each area
- incorporate these standards into an on-the-job training system that allows for easy monitoring and evaluation of worker performance

Industry associations should encourage these actions within their member companies.

Background

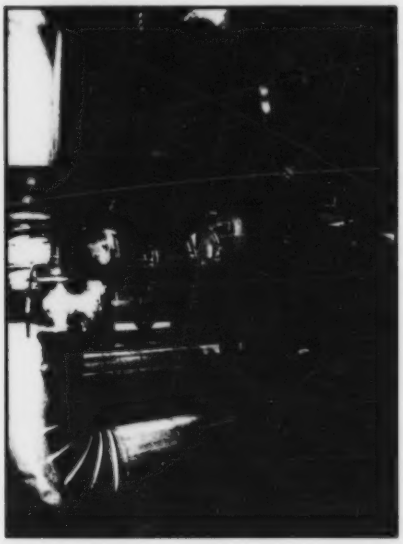
The majority of field workers within the upstream petroleum industry learn their tasks through experience. In view of this, minimum standards of skill and safety performance must be established for each sector of the industry, and integrated into workers' daily work routines.

Industry agrees throughout that training makes a vital contribution to safe operations. A report issued in 1979 by the SAGE Institute (Edmonton) Ltd., Safety in the Oil Fields, highlighted lack of personnel training as a major contributing factor to poor safety performance in various sectors of the industry.

It is a fact when training and safety budgets are reduced, accidents increase. If training were incorporated into on-the-job work procedures, it would be less vulnerable to budget cuts. It also would become an accepted part of work practices, thereby significantly improving both work practices and attitudes toward safety within the industry.

Another reason for on-the-job training is that work procedures are often very specific. An example of this is in the drilling sector, where rig equipment varies greatly, to the extent that no two rigs are identical. It is critically important all crew members be at least familiar with the majority of the components and how they interact in order to do their jobs efficiently and safely.

An example of an on-the-job training program is TASCAN (task analysis), a system designed for the drilling industry. An excerpt of this program is included in Appendix F, page 94 of this report; more details are available from the CAODC.



RECOMMENDATION 24: New Employee Orientation to be Conducted in All Industry Sectors

Every employee new to a work site, in any sector of the industry, should be oriented to the critical areas of the job and to general work requirements.

Action Plan

Each company should develop job and work site orientation procedures and a checklist. Supervisors must take the time to give all new employees an orientation and have the employees sign a checklist.

Background

Job orientation should help reduce the number of accidents caused by lack of familiarity with both work sites and work procedures. The orientation should include:

- Administration
  - — T1 forms
  - — application form
  - — health care/medical forms
  - — introduction to the work
  - — pay, hours and allowance policies
  - — safety policy
  - — company policies

  (The above administrative details are usually covered in the company's personnel office. For rig workers, this information may be discussed at the work site.)

- Work environment
  - — hazards
  - — personal protection
  - — location and use of safety equipment
  - — line of authority

- Site tour
- Introduction to crew or staff
- Discussion of job description with first-line supervisor

Samples of employee orientation checklists are included in Appendix G, page 95.

SAFETY AWARDS

RECOMMENDATION 25: Companies in the Petroleum Industry to Recognize Employee Safety

Safety award programs for individual employees should be developed and implemented by all companies operating in the petroleum industry. These programs should provide strong peer pressure and appropriate employer recognition and support of employees' safe work performance.

Action Plan

a) Companies employing workers in the petroleum industry should research safety award programs and develop their own criteria and implementation plans for programs. An effective way of providing recognition is by making the awards at special safety banquets or meetings.

b) Worker input should also be obtained and incorporated into the program.

Background

Operating companies, contractors and their workers must recognize the value of working safely. Company safety award programs would provide this incentive to workers.

Reward programs need not be of high monetary value to be successful. Recognition from peers and employers is stronger motivation for changing attitudes and improving performance than money or material gifts. To be successful, awards programs should be given a high profile through broad internal publicity of worker achievements and through involvement of management in the awarding process.

RECOMMENDATION 26: Industry Associations to Develop Safety Awards Programs for Member Companies

All upstream petroleum industry associations are encouraged to develop safety award programs for their member companies, particularly those associations whose member companies are too small to have meaningful company award programs.

Action Plan

Industry associations should assess whether safety award programs would be meaningful for their members and, if so, should implement safety award programs for their member companies.

Background

Industry association awards recognizing safe work histories of their member companies would encourage safe work procedures. Contractors whose future work depends on how safely they work would have a particular incentive to obtain these awards.

Some industry associations such as CAODC, Canadian Gas Producers Association and the Petrochemical Safety Council already have safety award programs.

RECOMMENDATIONS FOR SPECIFIC INDUSTRY SECTORS

This section of the report contains recommendations 27 through 42. These recommendations apply only to specific industry sectors. Those sectors addressed include:

- Drilling (with the subsections Drilling Rig Operations and Service Rig Operations)
- Exploration
- Field Construction
- Transportation

The previous section, Recommendations for Industry and Government, also applies to each industry sector and must be read together with this section for a review of all recommendations for a particular sector.

DRILLING – Drilling Rig Operations

RECOMMENDATION 27: Rig Safety Inspections to be Held Regularly, with Participation by Both Operating Company and Contractor

Rig inspections should be regularly scheduled and conducted using an industry-standard, rig-safety inspection checklist. Both the operating company's representative and the contractor's rig manager should participate in these inspections.

Action Plan

a) CAODC, CPA, IPAC and SEPAC should prepare a general rig inspection checklist, by combining ERCB, OH&S and CAODC inspection lists. The associations should make this standard checklist available to all member companies. (A sample rig inspection checklist is presented in Appendix H, page 98.)

b) Individual operating companies and contractors should customize this rig inspection checklist to their own equipment and operations.

c) The contractor's rig manager and the operating company's representative should both conduct rig safety inspections and be responsible for immediately correcting deficiencies. These inspections should occur both before drilling (pre-spud) and at regularly scheduled intervals while drilling (daily and weekly).

Background

A review of rig inspections within various drilling rig companies showed that not all contractors are using rig inspection programs and those that do have variable standards. Some drilling contractors are requesting operating companies' representatives be more involved in actual inspections.

Supervisor feedback from regular, thorough rig inspections helps workers more easily identify potential problem areas or hazards. All drilling operators and contractors should have rig inspection checklists as part of their safety programs.

RECOMMENDATION 28: Drilling Industry to Implement a Job/Task Observation System

The drilling industry should implement a system of job/task observation for drilling supervisors and key personnel.

Action Plan

The drilling industry, through industry associations and the proposed Industry Safety Implementation Committee, should:

- approach PITS with a job/task observation training proposal and assess the possibility of incorporating it into the current Level II well control training program. The course length should remain the same.
- work with PITS to develop a job/task observation program specific to oil and gas drilling operations
- produce a training program, which could include a video on how to conduct job/task observation for classroom and field training
- ensure all field supervisors satisfactorily complete the training and implement job/task observation in their operations. Implementation of the system involves:
  - explaining the system to workers
  - keeping records
  - evaluating the system's effectiveness

Background

Drilling sectors were responsible for 71 percent of upstream petroleum industry accidents between 1980 and 1988 (WCB statistics in Appendix B, page 56). The drilling sector demands more physical exertion than most other industry sectors, and because of seasonal and government incentive peaks, requires the most drastic shifts in worker numbers. Formal training in this area is hampered by constant overtime hours and a transient workforce.

Job/task observation is a system whereby supervisors incorporate safety observation and other safety supervision into their routine business day. They systematically assess work conditions and observe workers doing predetermined segments of work, specific assignments or sets of actions. This is followed by positive reinforcement of safe work procedures, or direction for improvement, if required.

Implementing job/task observation as a regular supervisory practice would greatly reduce current accident frequencies. This would be due to heightened work safety awareness and improved communication and leadership techniques by supervisors. There are also additional benefits such as:

- increased effectiveness of job procedures
- identification and correction of substandard conditions before accidents occur
- identification and reinforcement of good work habits
- motivation for continuous awareness on the job
- effective leadership
- more accurate evaluation of worker safety and job performance

Supervisors could be trained in job/task observation in the well control training programs at PITS. Both the Du Pont STOP program and the International Loss

Control Institute's (ILCI) COACH program are examples of types of programs that could be used in developing the course. As an addition to this course, and also to inform crews at the rig site, a video presentation on job/task observation should be prepared specifically for drilling rig training.

RECOMMENDATION 29: Drilling Supervisors to be Trained in Safety Auditing

All operating company and contractor drilling supervisors should be trained in conducting work site safety audits.

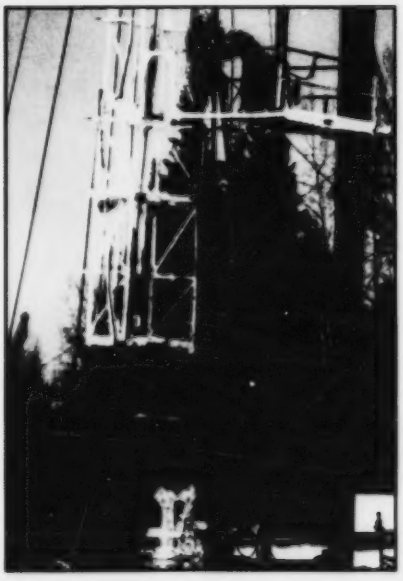
Action Plan

A safety audit training program should be developed and offered by PITS.

Background

Safety auditing is an excellent tool for checking a company's work site safety; it can be used to identify poor practices, equipment and conditions so they can be corrected. Training in auditing procedures is not available in training centres in Western Canada. The task force has identified a definite need for this type of training and requests PITS develop such a course.

RECOMMENDATION 30: Drilling Contractors to Implement On-the-Job Training Using TASCAN System



Drilling contractors should implement on-the-job training using the TASCAN (task analysis) system for their crews, rig managers and management personnel.

Action Plan

a) CAODC should advertise the TASCAN program to all its members and strongly encourage them to implement it.

b) Drilling contractors should approach the CAODC for information on TASCAN and assistance in implementing it.

Background

TASCAN is a system that defines specific job tasks and expected performance standards for each person working on a rig. For example, the TASCAN profile for a floorhand outlines all tasks required for that position and establishes individual training needs (see Appendix F, on page 94). The training is done on the job on an individual basis according to worker needs and abilities.

TASCAN can provide workers with information they need to do their jobs efficiently and safely. The TASCAN system also provides standards against which supervisors can evaluate worker progress. The system helps in evaluating employee performance, especially for universally defined tasks.

In addition, because TASCAN is on-the-job training, it can easily be tailored to specific rigs and operations. As mentioned in Recommendations 21 and 23 under Certification and Training, knowledge and experience necessary to work on rigs vary greatly with the type of drilling and the rig equipment.

DRILLING – Service Rig Operations

RECOMMENDATION 31: Training and Qualification Standards to be Developed for Service Rig Personnel

Minimum standards for training and experience levels should be developed for all service rig personnel.

Action Plan

A committee comprised of the industry and government Drilling and Completions Committee and the proposed Well Site Supervisors' Association (Recommendation 20) should develop minimum training and experience requirements for each service rig crew member.

Background

The training and experience standards recommended here are in addition to those already required as part of certification. Additional standards would further ensure personnel are qualified to do service rig work safely.

RECOMMENDATION 32: Service Rig Contractors to Implement On-the-Job Training Using TASCAN System

Service rig contractors should implement on-the-job training using the TASCAN system for their crews, well site supervisors and management.

Action Plan

Service rig contractors should approach the CAODC for information on TASCAN and assistance in implementing it.

Background

The background for recommending the TASCAN system for service rig personnel is the same as in Recommendation 30 for drilling rig personnel.

EXPLORATION

RECOMMENDATION 33: Seismic Workers to be Trained in Safe Working Techniques

Seismic workers should be trained in safe working techniques, particularly in working on uneven surfaces and rough terrain, to avoid strains and sprains.

Action Plan

CAGC should develop a course to address:

- identification of hazardous working surfaces and conditions
- methods of preparing work areas for safety
- proper lifting and pulling techniques
- prevention of injuries such as strains, sprains and bruises

CAGC should approach OH&S for information and assistance.

Background

Most injuries incurred in seismic operations involve strains, sprains and bruises associated with slips or falls on uneven working surfaces. Injuries to the back, legs, arms, ankles, and wrists make up to 50 percent of all seismic worker injuries.

Training in areas mentioned in the action plan would make workers more aware of potential hazards and ways to prevent injuries. Training is presently coordinated in part by the CAGC; this should continue. They have a training subcommittee in place, which has resources greater than those of individual companies.

FIELD CONSTRUCTION

RECOMMENDATION 34: Construction Safety Training to be More Available to the Oil and Gas Construction Industry

The government and the construction industry should work together to develop training courses specific to construction within the oil and gas industry.

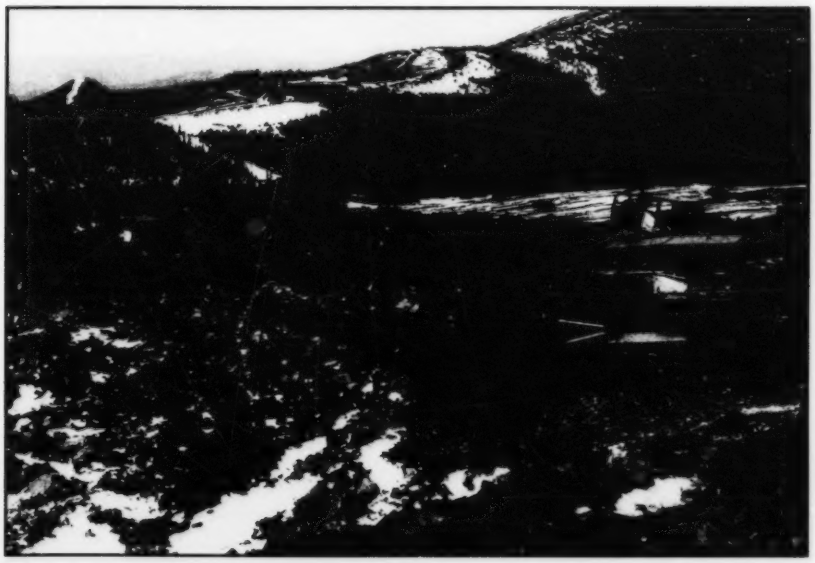
Action Plan

a) Members of the oil and gas construction industry should work with OH&S and training institutions to develop courses pertinent to construction safety.

b) The construction industry should determine whether Heritage Grant funds and additional private funding would cover costs.

Background

Current facilities for construction training are inadequate in terms of quality, amount, coverage and funding. There is a real need by both industry and government to expand the scope of training.



TRANSPORTATION – Pipeline Operations

RECOMMENDATION 35: Pipeline Operators to Adhere to Basic Operating and Maintenance Standards

All pipeline operators should ensure they adhere to basic safety requirements for pipeline operations and maintenance, and for proper design of pipeline and ancillary equipment.

Action Plan

a) A joint industry committee made up of representatives from SEPAC, CPA, and IPAC should be formed to develop specific standards for safe work procedures on pipeline operations.

b) The same joint committee should also develop and establish training programs for pipeline companies.

Background

Good operating standards and safe work practices can prevent accidents. The establishment of specific work standards by industry associations concerned, SEPAC, CPA and IPAC, would be an effective way to improve work performance within the pipeline industry.

The same industry associations should develop and establish training programs on pipeline operations because many of the companies are too small to do this on their own. Also, with the exception of internal programs within larger companies, training programs on pipeline operations are almost non-existent.

The training program should include work methods and safety precautions for the following areas:

a) operations (including physical properties of all products, gauging, pigging, start-up, shutdown, blanking and blinding)

b) maintenance (including sour and sweet products, high/low vapour pressure and temporary/permanent repair standards)

c) modifications (i.e., regulatory pipeline excavation procedures, hot taps, cleaning and X-ray)

d) emergency response (i.e., rescue, spill and leak detection and containment, clean-up procedures, emergency contacts (internal/external), emergency shutdown procedures, community awareness and exercises, depressurization and system maps)

e) design
- adherence to applicable codes and regulations
- warning tape above installed pipeline or protruding fitting
- isolation valving system
- check valves
- continuous monitoring, i.e., pressure, flow and leak detection
- H_2S monitoring on gas systems
- design of scraper traps with interlock
- process hazard analysis
- corrosion protection

f) training (supervisors, workers and contractors)
- system operation
- safe working procedures
- defensive driving
- H_2S training
- first aid and CPR training
- emergency response
- fire fighting and prevention training
- blinding and blanking
- confined space entry
- respiratory protection
- gas detection
- use and limitation of personal protective equipment
- repressurizing and displacement of contents
- scraper trap operation

g) safety audits

h) abandonment

The following recommendations are concerned with the hauling of equipment and materials used in drilling, well servicing, construction and production operations in the field.

RECOMMENDATION 36: An Oilfield Trucking Association to be Formed

An oilfield trucking association should be formed to recommend and implement safety and operational standards in the oilfield trucking industry.

Action Plan

a) PSAC, which has started a new trucking association called OTA should continue this initiative.

b) Major industry associations and government must support this new association.

c) PSAC should invite all carrier companies to attend meetings on a proposed association structure and objectives.

Background

Until recently, there was no association or organization within the oilfield trucking industry with the mandate to establish and monitor safety and operating standards for oilfield truckers. This lack of cooperative effort has prevented any significant improvement in trucking safety.

At the time of publication of the SAGE report, the Canadian Oilfield Heavy Haulers Association existed; however, it disbanded through lack of support by its members, chartering companies and government. The SAGE report recommendations for oilfield trucking were not implemented, primarily because there was not an effective organization to implement them.

Now a new trucking association is being formed under PSAC. For this new trucking association to be effective and for the pertinent recommendations in this report to be realized, member companies of the major industry associations, along with government, must show their support. One means of support would be encouraging companies to hire carriers with membership in the association.

RECOMMENDATION 37: Minimum Training Standards and Courses for Oilfield Trucking to be Established

The oilfield trucking industry should establish minimum training standards for the various trucking jobs and promote the necessary training courses.

Action Plan

a) OTA (discussed in Recommendation 36) should establish minimum training standards for each trucking position and determine the availability of training resources and funding.

b) The association should either lobby government for the return of cancelled courses or request government funding to develop new courses.

c) OTA should promote the courses to all members and arrange for travelling training facilities for smaller oilfield centres.

Background

Established training standards for all workers in trucking will ensure personnel are qualified to safely do all types of trucking work. More courses are needed as few exist; also, a shortage of qualified drivers is developing. The oilfield truck-

ing industry has to rely mainly on hands-on experience as a method of training new entrants to the business. The programs should improve the industry's safety performance and make it easier for new workers to enter the oilfield trucking industry.

Much information is already available for use in a training program: a Rig Move Procedures Manual developed by the CAODC, a Safety Policies and Working Procedures document designed by the work party of the Sage Study Group, and various standard programs established by the oil industry, such as H_2S certification.

Government support is needed to ensure training programs are uniformly set up and adequately funded.

RECOMMENDATION 38: Industry and its Oilfield Truckers to Improve Work Planning and Operating Standards

Industry and its oilfield truckers should improve work planning and operating standards to level truckers' workloads as much as possible.

Action Plan

OTA should persuade all trucking members to plan trucking operations with their clients as much in advance as possible with the intention of minimizing rush jobs and levelling the work load.

Background

The trucking industry recognizes safety performance suffers and accidents tend to increase during periods of peak activity. During these peak periods, trucking companies must sometimes use inadequately experienced personnel and experienced personnel must work long hours.

Much work on acceptable trucking hours has already been done by PSAC and the OTA, and they are presently making a submission to the government on trucking hours and standards for the oilfield trucking industry.

TRANSPORTATION – Production Fluids Trucking

The following recommendations are concerned with the hauling of fluids resulting from oil and gas production and recovery operations in the field.

RECOMMENDATION 39: All Trucking Associations to Improve Membership and Commitment to Safety

Trucking associations such as the Alberta Trucking Association (ATA) or the newly formed OTA, should encourage production fluids truckers to join their organizations and should promote safety awareness among their members.

Action Plan

a) To increase membership, OTA and ATA should consider methods of encouraging companies that truck production fluids to join their associations. Encouragement could be provided by establishing committees to consider the special needs of this group of truckers and, since many of these companies are small, by setting fees according to their ability to pay.

b) To promote safety awareness among members, OTA and ATA should provide information on safety regulations, practices and standards and should help members in developing their own safety awareness programs. The trucking associations can also improve the safety of work procedures by promoting coordination between truckers and operating companies.

Background

The more production fluids haulers communicate with each other, with other types of truckers in the industry, and with operating companies, the greater the possibility of the entire industry working together to improve the safety of trucking operations. OTA and ATA should encourage production fluids truckers to join their associations to provide this forum for communication.

RECOMMENDATION 40: Industry to Develop a Code of Practice for Trucking of Production Fluids

The upstream petroleum industry, as represented by CPA, IPAC, PSAC, SEPAC, and ATA, should develop a code of practice for trucking of production fluids.

Action Plan

a) The industry associations, in coordination with the proposed Industry Safety Implementation Committee, should develop a code of practice for companies hauling production fluids and should promote it to trucking contractors and companies.

b) Trucking contractors and companies should utilize the code of practice to develop their own individual policies, standards and procedures.

Background

Adoption by the industry of a common code of practice for trucking production fluids would provide industry-wide policies, standards and procedures for trucking. The code would meet all applicable laws and regulations and would be an addition to, not a replacement for, each company's safety program.

This trucking code of practice is intended to result in:

- continuous improvement in safety awareness and safety practices by member companies
- a program for reduction of accident and incidents
- effective emergency response programs to minimize injury to the public and the environment
- cooperation among relevant industries in reducing hazards associated with handling and transportation of fluids
- reduced public anxiety about transportation of fluids

The development, implementation, auditing and updating of the code of practice would need to be clearly defined by the working committee.

A similar code, the TRANSCAER program, has been produced by the Canadian Chemical Producers' Association and can be used as a model for a code specific to trucking of production fluids within the upstream petroleum industry.

RECOMMENDATION 41: Trucking Industry to Adopt OH&S Safety Guidelines for the Handling and Transportation of Bulk Sour Products

All companies involved in handling and transportation of bulk sour products must adopt the Guidelines for the Handling and Transportation of Bulk Sour Products prepared by OH&S (Appendix I, page 100).

Action Plan

a) Industry associations should require member companies to submit letters acknowledging adoption of these guidelines.

b) Operating companies should ensure contractual agreements with trucking companies and contractors include the need to follow these OH&S requirements.

Background

Trucking of sour products must be done with utmost care because of the potential danger of sour products to both workers and communities surrounding transport routes. The OH&S guidelines for Handling and Transportation of Bulk Sour Products ensure safe procedures. They require:

- all truck drivers handling sour products hold a valid certificate from the PITS H_2S Alive course, or other equivalent courses acceptable to OH&S
- industry identify and designate all work sites where H_2S levels may exceed 10 ppm and take measures to develop appropriate operating procedures for these work sites
- industry adopt the requirement that during loading and unloading operations all truck drivers handling sour products wear appropriate respiratory protective equipment in accordance with the guidelines
- all carriers handling sour products develop and use a comprehensive checklist of procedures for truck drivers and maintenance personnel
- each carrier has in place a safety program that includes guidelines for handling sour products

RECOMMENDATION 42: Spark Arresters and Positive Air Shutoffs to be Required on all Diesel-Driven Equipment Used in Trucking of Production Fluids

All diesel-driven equipment used in hauling production fluids must have spark arresters and positive air shutoffs.

Action Plan

a) Industry associations should encourage members to add this requirement to their operating procedures.

b) Operating companies should ensure their trucks and all contractor trucks have spark arresters and positive-air-shutoff equipment on any diesel-driven equipment operating on their sites.

Background

Spark arresters are used on equipment operating in gaseous environments to prevent explosions. According to Section 182 of the General Regulation 448/83 under the OH&S Act, only diesel-driven equipment fitted with spark arresters must be operated in a Division II area (a hazard area defined in the National Fire Code). When hauling production fluids, the fluids of concern are those with flashpoints less than 37.8°C.

Positive air shutoffs are used on diesel engines operating in volatile fumes to ensure they do not continue to run when they have been shut off. Without positive air shutoffs, fuel-rich air can be drawn into a carburetor and continue to fuel the engine. For hauling products containing significant amounts of light ends (i.e., condensate, natural gas liquids, liquified petroleum gases, sour water, etc.), automatic, rather than manual positive-air-shutoff devices should be used.

RESPONSE TO OH&S ACTION PLAN

In 1987, OH&S became concerned with the number of fatalities within the petroleum industry. Through their research, they developed a proposed plan of action with 14 recommendations to reduce accident rates.

The task force has dealt with 10 of these recommendations in this report. The remaining four OH&S recommendations relate specifically to internal OH&S functions. The 10 OH&S concerns and how the task force handled the same concerns are presented below. OH&S concerns have been grouped together and in some cases, paraphrased.

MISSION STATEMENTS

OH&S

To decrease the rate of lost-time injuries by 1990 to 30 percent of the 1985 rates.

TASK FORCE RESPONSE

To improve the industry's safety performance to an acceptable level from public, government and industry points of view. An acceptable level is one that results from the best possible safety standards and work site modifications.

RECOMMENDATIONS

OH&S

Establish a mandatory competency/certification program for two priority occupation areas – the drilling and servicing sectors.

TASK FORCE RESPONSE

The task force believes increased certification will not ensure improved safety performance mainly because the areas not currently requiring certification are so diverse. Instead, the task force favours and recommends greater emphasis on training, including minimum training standards, on-the-job training, new employee orientation, and improved training for supervisors in the high-risk areas of drilling and servicing.

The task force also recommends OH&S fund and conduct more of its own training seminars for the petroleum industry and verify qualifications of private training companies before providing their names to industry.

(See Recommendations 15, 17 - 24, 28 - 36, and 38.)

OH&S

Promote a safety awareness campaign designed for maximum exposure to design and operations personnel in the industry.

Establish, in collaboration with industry organizations, a Petroleum Industry Safety Association to promote the cause of health and safety of workers in Alberta.

Develop and conduct a pro-active communications initiative to promote the objectives of this plan.

TASK FORCE RESPONSE

The task force recommends a basic safety program become a government-regulated requirement and be promoted by the various industry associations, including the proposed Industry Safety Implementation Committee, to operating companies and contractors.

In addition, contractors and operating companies will be encouraged by their associations and the committee to place greater emphasis on safety performance during bidding and awarding of contracts. The proposed Industry Safety Implementation Committee would also have the task of reviewing the feasibility of an industry safety association.

(See Recommendations 1 - 4.)

OH&S

Redesign and provide adequate resources to the inspection programs for the oil and gas industries.

Renew cooperation with the ERCB for active and continued support of field inspections programs.

Implement a comprehensive training plan for OH&S officers involved with the oil and gas industry.

Establish a plan in cooperation with industry and government organizations for the bilateral secondment of personnel to provide exposure to each other's operations.

TASK FORCE RESPONSE

The task force recommends OH&S increase its required qualifications for inspectors to include direct petroleum industry experience and have its inspectors begin providing more leadership to industry during inspections. It also recommends all government departments involved in inspecting petroleum industry sites coordinate their inspections.

(See Recommendations 9, 10 and 12.)

OH&S

Obtain departmental priority on proposals for amendments to the OH&S Act, including those for substantially higher penalties for violations.

Obtain departmental priority on processing of current proposals for amendments to OH&S regulations.

TASK FORCE RESPONSE

The fines for penalties under the OH&S Act have been raised and the task force supports this. In addition to higher fines, the task force recommends OH&S increase its inspections and assistance to companies with poor safety records.

The task force also recommends OH&S revise its Statute and Regulations Manual to make it easier to interpret and understand by industry, and make available more copies of its safety publications.

(See Recommendations 11, 13 and 16.)

GLOSSARY OF TERMS AND ACRONYMS

ATA	Alberta Trucking Association
BOP	Blowout Preventer
CAGC	Canadian Association of Geophysical Contractors
CAODC	Canadian Association of Oilwell Drilling Contractors
CPA	Canadian Petroleum Association
DACC	Drilling and Completions Committee with members from CAODC, CPA, IPAC, PSAC, ERCB and OH&S
ERCB	Energy Resources Conservation Board
ILCI	International Loss Control Institute
IPAC	Independent Petroleum Association of Canada
Level I Certification	The classroom training in blowout prevention for drilling rig workers and first-line supervisors.
Level II Certification	The more advanced level of blowout prevention and well control training for drilling rig workers and second-line supervisors. This includes practical training in circulating out a wellbore influx.
LTA	Lost time accident. If an individual is injured and cannot return to work on the next scheduled work time, then it is considered to be a lost time accident.
OH&S	Occupational Health and Safety
Operating Company	The company that is the actual operator on a work site (as per the Oil and Gas Conservation Act)
OTA	Oilfield Trucking Association, a subgroup of PSAC
PITS	Petroleum Industry Training Service
PSAC	Petroleum Services Association of Canada
SEPAC	Small Explorers and Producers Association of Canada
TASCAN	Acronym for task analysis; a method of job observation for drilling and service rig operations available from CAODC
WCB	Workers' Compensation Board

APPENDIX A: TASK FORCE COMMITTEE MEMBERS

STEERING COMMITTEE MEMBERS

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APPENDIX B: WCB INDUSTRY CLASSIFICATIONS INCLUDED IN ACCIDENT STATISTICS

EXPLORATION

9200 - Seismic Geophysical Exploration
9923 - Shot Hole Cementing

DRILLING

9600 - Drilling of Oil and Gas Wells
9603 - Directional Drilling Services
9900 - Hydrocarbon Well/Mud Logging
9901 - Wire Line and Downhole Fishing Services
9903 - Well Servicing with Service Rigs
9904 - Rathole Drilling
9905 - Operation of Power Swivels
9906 - Compressed Air/Water Equipment Servicing
9908 - Hot Oil Treatment
9909 - Perforating and Logging Services
9910 - Power Tong Operations
9911 - Cementing/Fracture/Chemical Treatment
9912 - Oil and Gas Well Testing and Coring
9913 - Sump Treatment and Disposal
9915 - Oil and Gas Well Casing Crews
9919 - Installation of Blowout Preventers
9920 - Clean Pipe Thread at Well Site
9921 - Servicing Christmas Trees by Means of a Tree Saver
9922 - Transport Drill Stem by Cable
9926 - Pumping Water to Drilling Rigs
9927 - Liquid Waste Disposal Service
9928 - Oil and Gas Well Blowout Control
9929 - Monitor and Control of Power Tongs

FIELD OPERATIONS

6300 - Operation of Oil and Gas Wells
6305 - Operation of Battery Tanks
6306 - Vacuum Removal of Wet and Dry Waste
6500 - Natural Gas Processing Plants
6501 - Sulphur Processing
9902 - Steam Cleaning Oilfield Equipment

TRANSPORTATION

51500 - Internal Cleaning and Coating of Pipelines
51501 - Purchasing, Selling, Transporting Oil
51508 - Purchasing, Selling, Transporting Gas
57400 - Natural Gas Distribution
57401 - Gas and Water Meter Reading

LOST-TIME ACCIDENTS
BY WCB INDUSTRY CATEGORIES
1980-1988

Industry	1980	1981	1982	1983	1984	1985	1986	1987	1988*	TOTAL
9200	190	198	213	289	298	327	216	268	325	2 324
9923	0	1	2	0	1	2	1	0	0	7
9600	1649	924	795	706	888	1182	747	657	541	8 089
9603	2	2	3	2	1	3	4	2	2	21
9900	3	3	0	2	3	1	0	0	0	12
9901	32	32	32	20	16	27	38	36	32	265
9903	575	389	417	391	570	677	482	367	264	4 132
9904	23	13	5	10	10	11	8	4	3	87
9905	0	0	0	0	2	1	0	0	1	4
9906	7	9	12	12	12	14	12	12	7	97
9908	7	14	10	4	7	9	9	6	3	69
9909	82	57	54	37	56	75	60	53	38	512
9910	22	10	10	17	11	18	12	7	12	119
9911	200	162	106	96	106	121	98	99	76	1 064
9912	80	65	41	20	36	61	63	44	27	437
9913	7	3	0	1	0	0	0	0	1	12
9915	1	1	0	0	0	2	0	3	3	10
9919	1	1	0	0	0	0	0	0	0	2
9920	0	0	0	0	0	0	0	0	0	0
9921	0	0	1	0	0	0	3	1	1	6
9922	0	2	1	1	2	4	0	3	2	15
9926	0	0	0	0	0	1	0	1	0	2
9927	0	0	0	0	0	0	0	0	0	0
9928	0	0	0	0	0	0	1	0	0	1
9929	0	0	0	0	5	2	0	0	2	9
6300	109	137	108	157	158	186	139	136	134	1 264
6305	6	6	6	7	4	7	16	11	8	71
6306	22	15	11	13	19	31	30	25	22	188
6500	57	73	89	83	49	47	45	39	36	518
6501	51	60	49	26	13	25	34	6	10	274
9902	8	14	9	9	24	24	27	18	12	145
51500	2	0	1	0	0	0	0	0	0	3
51501	12	14	17	16	16	9	15	7	11	117
51508	48	48	41	43	32	30	30	35	37	344
57400	141	131	100	83	83	98	95	91	57	879
57401	0	0	0	0	0	0	0	0	0	0
TOTAL	**3 337**	**2 384**	**2 133**	**2 045**	**2 422**	**2 995**	**2 185**	**1 931**	**1 667**	**21 099**

*To November 30, 1988.
(Source: Assessment Department, WCB, Alberta)

FATALITIES
BY WCB INDUSTRY CATEGORIES
1980-1988

Industry	1980	1981	1982	1983	1984	1985	1986	1987	1988*	TOTAL
9200	0	1	1	2	0	1	1	0	1	7
9923	0	0	0	0	0	0	0	0	0	0
9600	11	4	8	2	1	7	5	2	2	42
9603	0	0	0	0	0	0	0	0	1	1
9900	0	0	1	0	0	0	0	0	0	1
9901	0	0	1	0	0	0	1	0	0	2
9903	1	1	3	1	1	4	2	1	0	14
9904	0	0	2	0	0	0	0	0	0	2
9905	0	0	0	0	0	0	0	0	0	0
9906	0	0	0	0	0	0	0	1	0	1
9908	1	0	1	0	0	0	0	0	0	2
9909	0	0	0	0	0	0	1	0	1	2
9910	0	0	0	0	0	0	0	0	0	0
9911	3	0	0	0	0	0	1	1	2	7
9912	1	2	0	0	0	0	0	0	0	3
9913	0	0	0	0	0	0	0	0	0	0
9915	0	0	0	0	0	0	0	0	0	0
9919	0	0	0	0	0	0	0	0	0	0
9920	0	0	0	0	0	0	0	0	0	0
9921	0	0	0	0	0	0	0	0	0	0
9922	0	0	0	0	0	0	0	0	0	0
9926	0	0	0	0	0	0	0	0	0	0
9927	0	0	0	0	0	0	0	0	0	0
9928	0	0	1	0	0	0	0	0	0	1
9929	0	0	0	0	0	0	0	0	0	0
6300	1	1	3	1	2	5	2	2	2	19
6305	1	1	0	0	0	1	0	0	0	3
6306	0	0	1	0	0	2	0	0	1	4
6500	0	3	0	1	0	0	0	0	4	8
6501	0	0	0	1	0	0	0	0	0	1
9902	0	0	0	0	0	1	1	0	0	2
51500	0	0	0	0	0	0	0	0	0	0
51501	1	0	0	1	0	2	0	0	0	4
51508	0	0	0	0	0	0	0	0	1	1
57400	0	0	1	0	0	0	1	0	0	2
57401	0	0	0	0	0	0	0	0	0	0
TOTAL	**20**	**13**	**23**	**9**	**4**	**23**	**15**	**7**	**15**	**129**

*To November 30, 1988.
(Source: Assessment Department, WCB, Alberta)

WCB CLAIM COSTS FOR LOST TIME ACCIDENTS BY WCB INDUSTRY CATEGORIES 1980 - 1988

Industry	1980	1981	1982	1983	1984	1985	1986	1987	1988*	TOTAL
9200	$ 403 093	$ 834 156	$ 917 972	$ 740 015	$ 1 458 948	$ 1 468 617	$ 704 102	$ 496 089	$ 755 985	$ 7 778 978
9923	0	247	1 485	0	1 059	7 300	3 971	0	0	14 062
9600	11 205 421	6 963 278	9 809 827	6 302 936	6 967 811	10 775 325	6 580 172	3 058 162	2 589 634	64 252 566
9603	1 697	1 325	91 519	234	5 028	5 180	40 381	16 739	6 915	169 016
9900	2 336	1 304	140	5 238	4 511	180	0	0	0	13 709
9901	29 893	58 767	38 362	80 540	37 268	85 212	485 878	73 263	102 680	991 864
9903	3 835 284	1 811 538	2 992 408	2 737 345	4 901 423	4 994 018	3 914 019	1 807 957	836 632	27 830 625
9904	28 633	42 735	15 745	78 734	63 809	97 620	188 210	4 912	9 480	529 879
9905	0	0	0	0	2 466	8 539	0	0	4 500	15 504
9906	8 009	8 913	597 603	13 502	29 910	29 891	47 890	215 249	1 616	952 583
9908	4 917	43 177	47 586	7 834	10 183	127 656	43 955	12 112	12 135	309 556
9909	346 845	264 492	1 092 018	347 126	204 000	704 235	184 605	330 992	165 225	3 639 539
9910	130 861	18 460	20 401	328 628	217 582	77 948	81 001	29 886	158 241	1 063 007
9911	803 170	975 439	387 642	1 585 619	601 719	905 183	572 198	402 817	202 806	6 436 593
9912	1 779 086	1 154 411	66 591	50 956	234 604	327 344	332 932	192 387	62 890	4 201 201
9913	4 322	1 753	0	4 842	0	0	0	0	8 020	18 938
9915	310	631	0	0	0	4 328	0	14 734	13 417	33 420
9919	1 608	8 819	0	0	0	0	0	0	0	10 426
9920	0	0	0	0	0	0	0	0	0	0
9921	0	0	191	0	0	0	44 431	4 053	258	48 933
9922	0	2 113	89	3 233	3 650	25 942	0	7 318	1 850	42 194
9926	0	0	0	0	0	99	0	1 721	0	1 820
9927	0	0	0	0	0	0	0	0	0	0
9928	0	0	0	0	0	0	4 075	0	0	4 075
9929	0	0	0	0	4 253	46 791	0	0	2 563	53 607
6300	1 344 690	1 652 357	737 189	544 613	1 484 957	1 651 958	642 214	518 843	533 586	9 110 407
6305	13 473	5 982	21 863	12 628	50 394	65 998	26 068	44 289	26 106	266 801
6306	149 616	53 752	171 738	57 140	112 298	73 749	121 325	85 373	80 830	905 822
6500	176 301	903 214	234 812	648 156	1 028 099	298 830	555 893	96 387	108 029	4 049 721
6501	57 527	496 672	80 415	216 497	190 229	240 716	173 458	13 985	30 415	1 499 912
9902	5 034	16 029	4 322	43 150	43 556	108 570	159 946	50 046	39 037	469 689
51500	837	0	3 970	0	0	0	0	0	0	4 807
51501	7 587	41 113	8 977	97 375	128 836	1 059 456	35 939	8 649	5 000	1 392 931
51508	204 673	78 472	185 699	155 653	279 820	302 756	118 320	54 768	66 569	1 446 731
57400	116 523	131 043	113 464	220 002	147 967	174 992	244 791	96 216	45 874	1 290 873
57401	0	0	0	0	0	0	0	0	0	0
TOTAL	**$20 661 746**	**$15 570 192**	**$17 642 028**	**$14 281 996**	**$18 214 380**	**$23 668 433**	**$15 305 774**	**$ 7 636 947**	**$ 5 870 293**	**$138 851 789**

*To November 30, 1988.
(Source: Assessment Department, WCB, Alberta)

WCB CLAIM COSTS FOR FATALITIES
BY WCB INDUSTRY CATEGORIES
1980 - 1988

Industry	1980	1981	1982	1983	1984	1985	1986	1987	1988*	TOTAL
9200	$ 0	$ 164 465	$ 269 763	$ 449 130	$ 0	$ 242 955	$ 223 975	$ 0	$ 175 000	$ 1 525 288
9923	0	0	0	0	0	0	0	0	0	0
9600	1 580 115	765 538	1 901 003	449 941	173 555	1 202 655	1 127 016	440 500	350 000	7 990 323
9603	0	0	0	0	0	0	0	0	175 000	175 000
9900	142 094	0	0	0	0	0	0	0	0	142 094
9901	0	0	270 418	0	0	0	223 975	0	0	494 393
9903	147 419	166 629	767 017	225 591	173 225	975 076	447 950	0	0	2 902 907
9904	0	0	541 936	0	0	0	0	0	0	541 936
9905	0	0	0	0	0	0	0	0	0	0
9906	0	0	0	0	0	0	0	0	0	0
9908	140 894	0	66 000	0	0	0	0	0	0	206 894
9909	0	0	0	0	0	0	221 062	0	175 000	396 062
9910	0	0	0	0	0	0	0	0	0	0
9911	448 417	0	0	0	0	0	225 325	220 565	350 000	1 244 307
9912	141 494	330 695	0	0	0	0	0	0	0	472 189
9913	0	0	0	0	0	0	0	0	0	0
9915	0	0	0	0	0	0	0	0	0	0
9919	0	0	0	0	0	0	0	0	0	0
9920	0	0	0	0	0	0	0	0	0	0
9921	0	0	0	0	0	0	0	0	0	0
9922	0	0	0	0	0	0	0	0	0	0
9926	0	0	0	0	0	0	0	0	0	0
9927	0	0	0	0	0	0	0	0	0	0
9928	0	0	230 278	0	0	0	0	0	0	230 278
9929	0	0	0	0	0	0	0	0	0	0
6300	46 759	164 429	813 030	225 565	344 610	956 741	447 950	440 500	350 000	3 789 584
6305	142 237	166 629	0	0	0	4 072	0	0	0	312 938
6306	0	0	270 168	0	0	345 000	0	0	175 000	790 168
6500	0	500 801	0	223 115	0	0	0	0	700 000	1 423 916
6501	0	0	0	0	173 105	0	0	0	0	173 105
9902	0	0	0	0	0	244 755	220 250	0	0	465 005
51500	0	0	0	0	0	0	0	0	0	0
51501	142 294	0	0	225 815	0	505 383	0	0	0	873 492
51508	0	0	0	0	0	0	0	0	175 000	175 000
57400	0	0	270 168	0	0	0	223 975	0	0	494 143
57401	0	0	0	0	0	0	0	0	0	0
TOTAL	**$ 2 931 723**	**$ 2 259 186**	**$ 5 399 781**	**$ 1 799 157**	**$ 864 495**	**$ 4 476 637**	**$ 3 361 478**	**$ 1 101 565**	**$ 2 625 000**	**$ 24 819 022**

*To November 30, 1988. These figures are based on preliminary estimates of $175 000 per average 1988 fatal claim.
(Source: Assessment Department, WCB, Alberta)

APPENDIX C: INDUSTRY ASSOCIATION DESCRIPTIONS

UPSTREAM PETROLEUM INDUSTRY ASSOCIATIONS

The Upstream Petroleum Industry Task Force on Safety had, as members of its steering committee, representatives from the following five industry associations: IPAC, PSAC, CPA, CAODC and SEPAC. Through the participation of these associations, all sectors of the industry had coverage and input, resulting in a true representation of concerns for safety within the entire industry. A brief background on these associations follows.

CANADIAN PETROLEUM ASSOCIATION

The Canadian Petroleum Association comprises medium to large Canadian and international exploration, production and pipeline companies operating in Canada. Its members are the industry's major employers.

The 65 active members of the CPA account for more than two-thirds of all upstream petroleum spending in Canada, produce about 80 percent of all crude oil and about 70 percent of natural gas, and conduct more than 90 percent of all pipeline activity.

The CPA conducts policy analysis and development for its members, facilitates problem solving in the industry, serves as interface between its members and other agencies, and acts as spokesperson.

INDEPENDENT PETROLEUM ASSOCIATION OF CANADA

The Independent Petroleum Association of Canada is a Canadian trade association formed in 1960. It represents over 180 independent companies exploring for and producing crude oil and natural gas. Another 150 members provide service and support to these independents.

IPAC's mission "is to attain an economic and regulatory environment which encourages the growth and well being of the independent sector of Canada's crude oil and natural gas industry." On behalf of its members, the association also works to achieve a responsive and stable fiscal and regulatory framework for the industry through the development of balanced and farsighted energy policies. Specifically with respect to safety, the associations's long-term goal is to encourage and support measures that promote sound safety practices in the industry.

CANADIAN ASSOCIATION OF OILWELL DRILLING CONTRACTORS

The Canadian Association of Oilwell Drilling Contractors, formed in 1949, is a trade association that represents the contract drilling and service rig industry in Canada. Membership in the association is comprised of over 80 drilling contractors, close to 50 service rig contractors, and over 80 associate members.

The CAODC was established to provide a means of communication and cooperation among drilling contractors and to improve the status of the oilwell drilling contracting industry as a whole. Safety is a major concern of the association. The CAODC liaises with federal and provincial governments, municipal authorities and others in matters relating to the oil and gas well drilling industry.

PETROLEUM SERVICES ASSOCIATION OF CANADA

The Petroleum Services Association of Canada is a trade association representing some 180 companies involved in oilfield service, supply and manufacturing. PSAC was formed in 1981 to provide a unified body aimed at effectively managing industry matters and improving relationships between the industry and various customer groups, the government and the public.

The companies in this association are contracted almost exclusively to oil and gas exploration and production companies.

SMALL EXPLORERS AND PRODUCERS ASSOCIATION OF CANADA

The Small Explorers and Producers Association of Canada was formed in 1986 to represent the interests of small companies and individuals when dealing with governments and the public. Their goal is to obtain a fiscal framework in Canada that enables productive investment in oil and gas resources.

The association has over 212 members and 5 associate members.

APPENDIX D: SUMMARY TABLE OF RECOMMENDATIONS

Recommendation	Objectives	Responsibility	Action
RECOMMENDATIONS FOR INDUSTRY AND GOVERNMENT			
MINIMUM BASIC SAFETY PROGRAM			
1. Introduction of a Minimum Basic Safety Program	To become a regulated requirement for all operating companies and contractors	Alberta Government	Add this new regulation to the OH&S Act
Program should include:			OH&S to enforce regulations through random audits
- Management Commitment and Involvement - Hazard Assessment and Control - Rules and Work Procedures - Training and Motivation - Communication and Group Meetings - Accident Investigation and Analysis		Task Force	Provide Basic Safety Program
		Industry associations	Make available copies of the program to their members
		Operating companies and contractors	Implement and audit safety programs on an ongoing basis
BIDDING PROCEDURES AND CONTRACTING TERMS			
2. Safety as a contractual requirement	To include review of bidders' safety records, policies and procedures	Operating companies	To give substantial weighting to contractors' safety history when evaluating bids
			To provide leadership in safe work practices
		Contractors	To supply required safety information with bids
INDUSTRY SAFETY IMPLEMENTATION COMMITTEE			
3. Formation of a committee to follow up task force recommendations	To form an Industry Safety Implementation Committee	CPA, SEPAC, IPAC PSAC and CAODC	Designate members from their Boards of Directors
		ERCB and OH&S	Agree to be represented on committee
		Proposed Safety Implementation Committee	Prepare terms of reference and work plan for implementation of recommendations; monitor implementation and safety statistics; address common safety issues; report to association boards of directors

Recommendation	Objectives	Responsibility	Action
4. Industry Safety Association	To be responsible for education, training information, statistics regulatory review and liaising with government, public relations, equipment safety standards, consulting, programming services, special awards, competitions and annual conferences	Proposed Safety Implementation Committee	To review merit and feasibility of introducing an industry safety association within three years
ACCIDENT REPORTING			
5. Introduce new reporting methods	To improve accident reporting	Proposed Safety Implementation Committee, OH&S and WCB	Prepare new accident form to meet needs of both industry and government
			Create classes specifically for each industry sector of upstream petroleum industry
		WCB	Introduce new form
6. Statistics accessibility	To expand data recorded and make it more accessible and useful to industry	Proposed Safety Implementation Committee	Aid government in designing computer software to analyze statistics and produce reports in a variety of formats
		Government	Install new system by end of 1989 and publicize its availability to industry
7. Accident frequency calculations	To begin using the same formula for calculating lost time accident frequency and severity	WCB, Alberta	Use formulas recommended in task force report
			Approach Saskatchewan and B.C. to discuss standardizing formula across Western Canada
		Associations	Promote use of these indices to member companies
DRILLING AND SERVICING CYCLE			
8. Level highs and lows of industry cycle	To improve annual drilling cycle	Government	Revise incentive programs to minimize end-of-incentive rush
		Industry	Encourage early planning for exploration to level the workload and provide contractors with longer term contracts
		CPA, IPAC and SEPAC	Develop educational program for member companies on benefits of multi-well drilling contracts and levelling of drilling activity

Recommendation	Objectives	Responsibility	Action
INSPECTIONS AND REGULATIONS			
9. Improve inspections	To increase qualifications of OH&S inspectors to include petroleum industry experience	OH&S	To provide upgrading for current inspectors lacking petroleum industry experience To begin hiring inspectors with experience in oil and gas drilling, operations or facility construction
10. Coordination of government inspections	To make inspections more effective	Government	Senior levels of all departments doing inspections to develop ways to reduce overlap and conflict Phase in coordinated inspections within 12 - 18 months
11. Increased inspections and assistance for companies with poor accident records	To utilize inspections as method for improving overall safety performance	OH&S and ERCB	Maintain a list of companies with safety performance records below industry average Provide additional assistance through increased inspections and record observations Assist companies by providing them with cause and prevention information whenever possible Shut down companies that make no effort to improve poor safety performance
12. OH&S to provide more leadership and consultation	OH&S inspectors to take on a proactive role	OH&S	Broaden scope of inspections to include audits of safety programs and procedures Advise on work methods to improve safety Ensure workers understand regulations
13. Revision of OH&S Statute and Regulations Manual	To be rewritten and made more useful to industry	OH&S	Change format, improve indexing, wording, grouping of information and cross-referencing
FUNDING CUTBACKS IN GOVERNMENT SERVICES			
14. Privatization of government services	To examine privatization of government services and ensure high standards are maintained	Proposed Safety Implementation Committee and government	Discuss any proposed cutbacks and privatization initiatives in General Safety Services Division, Alberta Labour, and OH&S Assess safety implications of privatization of any inspection departments before transferring services to private sector

Recommendation	Objectives	Responsibility	Action
15. OH&S to fund and conduct more training seminars	To take a more proactive role in training	Industry and OH&S	Meet and discuss training needs OH&S can provide
		OH&S	Organize and advertise more training seminars - including ones on OH&S legislation
		Industry	Increase its use of PITS
16. OH&S to improve access to safety publications	To make safety publications more available	OH&S	Increase availability and number of copies of regulations procedures and safety publications
17. Verification by OH&S of qualifications of of training companies and consultants it recommends	To verify competency and standards of training companies before names are submitted to industry	OH&S	Verify competency and qualifications of programs, and instructors on their list
			Provide names of only those companies meeting industry and government standards
WORK SITE SUPERVISION			
18. Operating company's work site representatives must be competent in the tasks being performed	To improve qualifications and experience levels of work site supervisors	Industry associations and operating companies	Develop standard training and experience levels for work site supervisors
			Hire only work site supervisors with adequate training and qualifications
19. Qualified on-site supervision for downhole operations	To ensure operating company representatives are qualified and on site during downhole operations	CPA, SEPAC, IPAC, proposed Well Site Supervisors Association and operating companies	Develop standard training and experience levels for work site supervisors including listed minimum requirements
			Hire only well site supervisors with Level II well control certification and qualifications that meet industry standards
			Agree to have qualified well site representative on site during any operations related to the well bore
20. Well site Supervisors' Association	To develop minimum standards for training qualifications and safety	Well site supervisor consultants, oilfield consulting firms and industry associations	Form a Well Site Supervisors' Association
			Develop minimum standards for well site supervision
			Coordinate appropriate training through industry training facilities and ensure new consultants receive on-the-job training from experienced supervisors

Recommendation	Objectives	Responsibility	Action
CERTIFICATION AND TRAINING			
21. Industry training preferable to further government certification	To respond to OH&S plan of action for more certification	Industry	Establish monitoring standards for supervisors as outlined in Recommendation 22
			Implement job/task observation system as described in Recommendation 28
			Support training institutions (PITS, NAIT and SAIT)
			Operating companies to consider contractor training when awarding contracts
22. Minimum training standards for supervisors	To establish minimum standards of safety training for supervisory personnel	Industry	Each sector to establish minimum standards for supervisors and organize training programs in-house or through SAIT, NAIT or PITS
23. On-the-job training programs	To be developed by each company	Companies	Determine areas where training is needed
			Develop and incorporate standards into training system that allow easy promotion, monitoring and evaluation of worker performance
		Industry associations	Encourage development and use of on-the-job training programs among member companies
24. New employee orientation programs	To be conducted in all industry sectors	Operating companies and contractors	Develop job and work site orientation procedures and checklists for use during orientation of new employees
SAFETY AWARDS			
25. Employee safety performance awards	To develop an award program for individual employees to provide strong peer and employer recognition of safe work performance	Company managers	Research and develop their own programs from existing ones and worker input
26. Company safety performance awards	To develop award programs for member companies	Industry associations	Assess whether award programs would be meaningful to members and implement them if research is optimistic (particularly in those associations whose member companies are too small to have meaningful company safety awards)

Recommendation	Objectives	Responsibility	Action
RECOMMENDATIONS FOR SPECIFIC INDUSTRY SECTORS			
DRILLING — Drilling Rig Operations			
27. Regular safety inspections	To ensure regular inspections with participation of both contractor's rig manager and operating company's representative	CAODC, CPA, IPAC, and SEPAC	Agree on general rig inspection checklist by combining ERCB, OH&S and CAODC lists.
			Make standard checklist available to member companies
		Operating companies and contractors	Customize checklist to their own equipment and operations
			Conduct regularly scheduled rig safety inspections before and during drilling, and immediately correct any deficiencies
28. Implement job/task observation system	To heighten worker safety awareness and improve communication and leadership	Industry associations and proposed Safety Implementation Committee	Approach PITS with job/task observation training proposal and assess possibility of incorporating it into Level II well control program
			Work with PITS to develop a program for oil and gas drilling operations
			Produce a training program on how to conduct job/task observation
			Ensure all field supervisors satisfactorily complete training and implement new system in operations
29. Safety auditing training for supervisors	To train supervisors in work site safety audits	PITS	Develop and offer a work site safety audit program
30. Drilling contractors to implement on-the-job training through TASCAN	To provide on-the-job training to deal with variations in job sites	CAODC	Advertise TASCAN system to all members for implementation.
		Drilling contractors	Approach CAODC for information and assistance in implementing TASCAN
DRILLING — Service Rig Operations			
31. Training and qualification standards to be developed for service rig personnel	To set minimum standards for training and experience	DACC and proposed Well Site Supervisors' Association	Develop minimum training and experience requirements for each service rig crew member
32. Service rig contractors to implement on-the-job training through TASCAN	To provide on-the-job training to deal with variations in job sites	Service rig contractors	Approach CAODC for information and assistance in implementing TASCAN

Recommendation	Objectives	Responsibility	Action
EXPLORATION			
33. Safety training for seismic workers	To decrease injuries due to working on rough surfaces	CAGC	Expand program to include training in safe work practices Approach OH&S for information and assistance
FIELD CONSTRUCTION			
34. Greater availability of training for construction safety	To develop training programs specifically for the oil and gas field construction industry	Construction industry and OH&S	Develop courses pertinent to construction safety at various training institutions Determine availability of Heritage Grant funds
TRANSPORTATION — Pipeline Operations			
35. Adherence to basic operating and maintenance standards	To implement appropriate standards and safe work procedures	SEPAC, CPA and IPAC	Develop specific standards for safe work procedures for pipeline operations Develop and establish training programs for pipeline companies
TRANSPORTATION — Oilfield Trucking			
36. Formation of an Oilfield Trucking Association	To recommend and implement safety and operational standards in oilfield trucking	PSAC	Initiative for OTA has been started by PSAC and should be continued Invite all carrier companies to meetings on proposed association structure and objectives
37. Minimum training standards and courses to be established	To develop minimum training standards for the various jobs in this area	OTA	Establish minimum training standards for each position and determine availability of training resources and funding Request government funding to reinstate cancelled government training programs or develop new ones Promote courses to all members and arrange for travelling facilities for smaller oilfield centres
38. Industry and its oilfield truckers to improve work planning and operating standards	To level truckers' work loads as much as possible	OTA	Persuade members to improve advance planning, minimize rush jobs and level work loads

Recommendation	Objectives	Responsibility	Action
TRANSPORTATION — Production Fluids Trucking			
39. Associations to improve membership and commitment	To promote safety awareness among a broader spectrum of the trucking industry	OTA and ATA	Encourage production fluids truckers to join
			Provide information to members on safety regulations, practices and standards, and help members develop their own safety awareness programs
40. Code of practice for trucking of production fluids	To develop a code of practice specifically for companies hauling sour products	CPA, IPAC, PSAC, SEPAC, and ATA	To develop and promote code of practice consistent to policies, standards and procedures that comply with current laws and regulations
		Trucking contractors	Develop individual company policies suited to operations
41. Adopt OH&S Safety Guidelines for Handling and Transportation of Bulk Sour Products	To make OH&S Safety Guidelines an industry requirement	Industry associations	Require member companies to acknowledge in writing their acceptance of these guidelines
		Operating companies	Ensure contractual agreements with trucking contractors include OH&S safety guidelines
42. Spark arresters and positive-air-shutoffs to be required on all diesel-driven equipment used to carry production fluids	To include requirements in operating procedures for all trucking companies hauling production fluids	Industry associations	Encourage members to add this requirement to their regular work procedures
		Operating companies	Ensure all diesel-driven trucks (theirs and their contractors') are equipped with these devices

APPENDIX E: MINIMUM BASIC SAFETY PROGRAM

WHY A SAFETY PROGRAM?

Good safety programs change attitudes and improve safety performance. Statistics support this — companies with safety programs have fewer accidents than those without programs.

A good safety program can improve the safety attitude of workers. Workers realize a company with a safety program is serious about safety, and the workers become concerned too. An improved attitude toward safety results in improved performance in every work activity and is a great deterrent to improper work practices.

A guide for preparing a minimum basic safety program for an oil industry company is outlined under the next heading and a sample program is included on page 79. Refer to the section Safety Pays for further support for a safety program.

The program is suited to small companies (5 to 50 employees), which:

- may work in any area within the oil industry
- if participating in wells, may be either operating companies or not
- may operate certain field production facilities, including gas processing plants, but these plants are likely of limited size and complexity (i.e., generally non-sour gas operations)
- when acting as an operating company for drilling, completions, workovers, etc., may use contracted field supervisors (i.e., consultants)
- may either be contractors or operating companies

STEPS IN STARTING A SAFETY PROGRAM

ASSIGNING RESPONSIBILITY

The president or chief executive officer and other managers of every company should play a leadership role in the development and implementation of a company's safety program. In many small companies, the day-to-day management of the program is also done by company managers or owners; however, in some businesses, someone else is assigned this work.

A suitable candidate for this safety responsibility is one who is a good team builder, has a positive attitude toward change, is committed, and has enough time for the work in addition to any other responsibilities.

Any person assigned the management of the safety program must have full support and financial commitment of management.

IDENTIFY AND ASSESS SAFETY AND HEALTH HAZARDS

One of the first steps in initiating a safety program is to assess current safety and health conditions at the workplace. This evaluation may be done either by the company safety person or by an outside consultant.

The following factors should be reviewed:

- employee work habits and procedures
- employee and supervisor concerns
- types of work and hazards involved

EVALUATE EXISTING INFORMATION

The next step is to review any safety policies and practices the company is already using. Some of this material may be suitable and need only minor modifications.

PRIORIZING NEEDS

To implement a new safety program smoothly, priorize necessary safety improvements and implement them one at a time. It is easier to make changes one at a time.

DEVELOPING AN ACTION PLAN

An action plan for implementing the safety program is a list of changes necessary, persons responsible, deadlines and detailed steps to take. An action plan is an easy way to plan, implement and monitor changes.

For an action plan to be successful, everyone in the organization should be told about the plan and should be involved in its implementation.

REVIEWING THE PROGRAM

The program should be reviewed occasionally by a team of safety professionals to assess its effectiveness. Reviews can be used to monitor how the program is working and to determine where improvements can be made. Continuous improvement will eventually result in a highly effective program.

SIX COMPONENTS OF A SAFETY PROGRAM

The task force recommends the minimum of the following six components for a successful safety program:

- Management Commitment and Involvement
- Hazard Assessment and Control
- Rules and Work Procedures
- Training and Motivation
- Communication and Group Meetings
- Accident and Incident Investigation

Various activities within each component are recommended to implement the program. Each company can easily modify program activities to suit the type of work it does.

This program is simple, easy to use and effective. However, it is not all-inclusive or the only possible safety program; there are many types, any of which could be effective. A sample safety program is included on page 79 and is compared with commercial safety programs on page 93.

MANAGEMENT COMMITMENT AND INVOLVEMENT

To give credibility and direction to a safety program, the leadership, commitment and visible involvement of senior management is imperative. On-site supervisors also play a vital role in promoting safety, setting examples and administering safety programs on the front-lines.

Management commitment is one of the strongest motivators for employees to improve their safety attitude. Commitment can be demonstrated through the following activities:

1. **Company Policy Statement**

   A company safety policy should be prepared and posted in the workplace. The policy should outline the safety and health goals of the organization and should explain the roles and responsibilities of the employer, supervisors and workers.

2. **Guiding Principles**

   The guiding principles included in this report have been endorsed and signed by each industry association's chairman or president. The chairmen recommend the guiding principles also be adopted by each company as part of its safety program.

3. **Safety Responsibilities**

   The specific responsibilities for safety must be clearly assigned and communicated by senior management to workers, contractors, and supervisors. When hiring contractors, these responsibilities should be specified in the contract document. These responsibilities should be used to set standards for performance evaluation and future work.

4. **Management Communication**

   Management commitment and concerns regarding safety must be continually communicated to all levels of management and to workers. This can be done through meetings, memos or other forms of communication.

5. **Management Walk-Arounds**

   Management walk-arounds on the work site to observe operations and safety procedures visibly show management's safety commitment. They also give employees a chance to talk to senior management about their safety concerns.

6. **Safety Program Evaluation**

   A company safety program should be evaluated regularly to ensure it is working effectively and goals are being achieved. Reviews also reveal weak areas that could be improved.

HAZARD ASSESSMENT AND CONTROL

Recognizing potential technical hazards and taking steps to control them is a major part of any effective program. This is an area requiring the full participation of all employees and supervisors, who must take responsibility for identifying and attempting to control the hazards within their work areas. The following are components integral to assessment and control.

1. **Inspections**

   If a company is just starting a safety program, the first inspection should be a thorough assessment of all potential hazards in the operation. Subsequent inspections and continuing daily observations by workers and supervisors will identify potential hazards in equipment, work site conditions, employee actions and job procedures. Rig safety inspections, in particular, should be done cooperatively with both the operating company and contractor using the standards set out by industry associations.

2. **Hazard Reports**

Employees should promptly submit reports of any hazards observed on the work site. These reports should be addressed quickly by management. Immediate response will encourage employees to continue to actively identify and rectify hazardous situations before they cause problems and accidents.

3. **Equipment Preventive Maintenance**

Proper equipment maintenance is a preventive measure against accidents. A detailed maintenance program, with checklists for pre-shift equipment checks and with maintenance manuals and procedures, will encourage employees to be aware of the risks of faulty equipment and avoid costly breakdowns.

4. **Purchasing Controls**

Standards for purchasing, leasing and renting materials, equipment, parts, machinery, facilities and processes should be set and written into a policy statement. Buying the least expensive equipment is not always the most cost-effective decision. Specific controls should be defined for hazardous materials, and must take into account all applicable government regulations.

5. **Engineering Controls**

Engineering controls are also important in the form of design standards for materials, equipment, parts, machinery, facilities and processes. In larger projects, engineering controls should be reviewed at every project stage. Standards for some types of equipment and construction can be obtained from the Canadian Standards Association, the American Petroleum Institute, the National Fire Protection Association and other organizations that set standards.

6. **Safety Audits**

Safety audits are used to measure the effectiveness of a safety program and to ensure it is being used correctly. Their results can be measured against an agreed standard or through an established base line, such as a previous audit. All companies should regularly audit their programs themselves or arrange to have an external safety professional perform them. Audits should be kept on file for at least five years.

RULES AND WORK PROCEDURES

Complete and detailed rules and work procedures are important to both management and the workers, and in some cases, are required by legislation. In addition to setting guidelines for performance, they also provide support as references in purchasing, training, engineering and emergencies.

1. **Safety Rules**

Safety rules should cover general policies regarding respiratory protection, personal protective equipment, safe lifting procedures, confined space entry, expected behaviour of employees, appropriate clothing and any other areas pertinent to the work site.

2. **Legislation Compliance**

Any applicable occupational health and safety legislation must be followed. Examples of pertinent legislation are occupational health and safety acts, workers' compensation acts, provincial fire codes, energy resources conservation board regulations, transportation of dangerous goods regulations and the workplace hazardous materials information system.

3. **Standard Work Procedures**

Standard work procedures should be defined to make employees aware of job hazards and to specify safety objectives for each job. These procedures encourage consistent work with maximum efficiency and safety. They can be supported by company and manufacturer procedures manuals when involving equipment. Employees should be encouraged to provide input in the development and maintenance of procedures.

4. **Personal Protective Equipment**

The proper personal protective equipment for each job should be specified in a safety program and worker use of the equipment should be mandatory. Items to be addressed include gloves, eye and hearing protection, breathing apparatus, foot wear, cold weather equipment, hard hats, flame-retardant clothing and protection from hazardous chemicals. The program should also include details regarding fitting, cleaning, storage, dispensing and collection.

5. **Rules and Procedures Enforcement**

Safety rules and procedures must be enforced, first through proper orientation and communication of all rules and procedures, and second, through communication of disciplinary measures that will be taken against those who fail to comply with them. A positive disciplinary program should include skill development, retraining and commendations as well as company and government punitive actions.

6. **Job Safety Analysis and Observation**

Job analysis and observation help to eliminate hazards before they cause problems. Supervisor observation of the job-site and work practices, soundly backed by engineering and management advice, can be used to assess the safety of operations and determine where improvements are needed.

7. **Emergency Procedures**

Procedures for possible emergencies must be prepared before emergencies occur and should be posted in highly visible areas. Each different situation should have its own set of emergency procedures which outline specific employee responsibilities, evacuation, medical attention, emergency contacts, location of fire fighting equipment, shut-down procedures, protection of vital records, and compliance with any legislated emergency procedures such as in the case of critical sour wells and gas plants.

TRAINING AND MOTIVATION

A training program should be a part of regular operations, in order to motivate employees, to give them necessary skills, to explain the need for safe operations and to give them confidence to do their jobs properly and safely. It should include orientations on procedures and hazard identification for employees new to job sites. Special training should be provided for critical tasks, such as the use of hazardous materials. Standard elements for any training program include:

1. **Management Training**

Company managers should obtain training on effective management of company safety programs. They should also attend safety seminars when they are available.

2. **Supervisory Training**

Supervisors should be trained in overseeing and managing work, including all procedures and components of their safety programs. They should be trained

in regulatory requirements and hazard recognition to be able to properly conduct inspections and safety audits, and they should also be able to train others through job-site orientations and on-the-job training.

3. **Worker Training Courses**

   Worker training must include job-site and procedural orientations, hazard identification and control, fire training and emergency procedures. It should also include any other training necessary for the type of work, such as safe driving, transportation of dangerous goods, cold weather survival, confined space entry, well control, respiratory protective equipment and H_2S training.

4. **Safety Orientation**

   A safety orientation should include a review of company policies and procedures and other instructional materials available to employees; specific job hazards; safety precautions; contractor, supervisor and employee safety responsibilities; government regulations; the company discipline policy and a worker's right to know and to refuse to perform unsafe acts on the job. Following this, a site walk-through, which includes the locations of personal protective equipment, should be done.

5. **On-the-Job Training**

   On-the-job training should teach procedures specific to safe completion of tasks. In addition, on-the-job training allows supervisors to refresh their workers' previous training by repeating information they learned earlier. This training can be performed on a weekly or monthly basis, in addition to safety orientations. Drilling and service rig companies are encouraged to use the TASCAN training program from CAODC.

6. **Training Records**

   In order to ensure training is kept up-to-date, detailed records of participants, topics, dates, materials provided and follow-up programs should be kept. This will assist supervisors to meet regulatory requirements, plan for future training programs and assess the effectiveness of past programs.

7. **Safety Awards**

   Award programs are very positive ways of building interest and pride in a safety program. The size of an award is not particularly important but the manner in which it is presented is. To be most successful, workers should have input in planning the awards program, and the awards should be made publicly in front of the recipients' peers.

COMMUNICATION AND GROUP MEETINGS

Effective communication between all levels of employees is necessary to monitor and improve work procedures and safety. The activities listed below can be used to ensure good communication. As well, training in interpersonal communication skills will increase the effectiveness of workers and supervisors conducting on-the-job training and will help those advising others on their practices and assignments.

1. **Safety Meetings**

   Depending on the circumstances, safety meetings can be held daily, weekly or monthly. A combination of these can be effective in order to cover immediate and long-term safety concerns. Pre-job, or tailgate meetings, can be used to discuss safety concerns specific to the particular job at hand. Safety meetings can also be used for additional training and to encourage worker input and communication.

Meetings should be held both by field workers in the field and by managers and engineers at head office.

Topics covered in safety meetings might include review of a recent accident and safety precautions to prevent its reoccurrence, new safety procedures and materials, new policies, or new technology. These meetings should be tailored to the specific needs of the location and scheduled to allow for open discussion.

2. Joint Work Site Health and Safety Committee

Depending on the job requirements of particular work sites, a joint work site health and safety committee may be required. This committee should be made up of workers and supervisors and should be used to discuss safety procedures and hazards.

Where this committee is not a legislated requirement, companies can have their own informal safety groups.

3. Health and Safety Posters

Posters provide visual reminders about the importance of good health and safety practices. They should provide positive reinforcement and be placed in highly visible areas.

ACCIDENT INVESTIGATION AND ANALYSIS

Management must investigate and analyze accidents to be able to take corrective actions to prevent recurrences. Accident investigation involves determining the underlying causes of the accident and specifying what actually happened. Analysis is an overall study of accident types, frequencies, locations and common causes. It also involves identifying risk areas, safety needs and accident trends, to determine where improvements are necessary.

1. Incident and Accident Reporting

All incidents, accidents and near-misses should be reported immediately to the supervisor, using either the WCB accident report form or an internal company form. The accident must also be reported to the WCB.

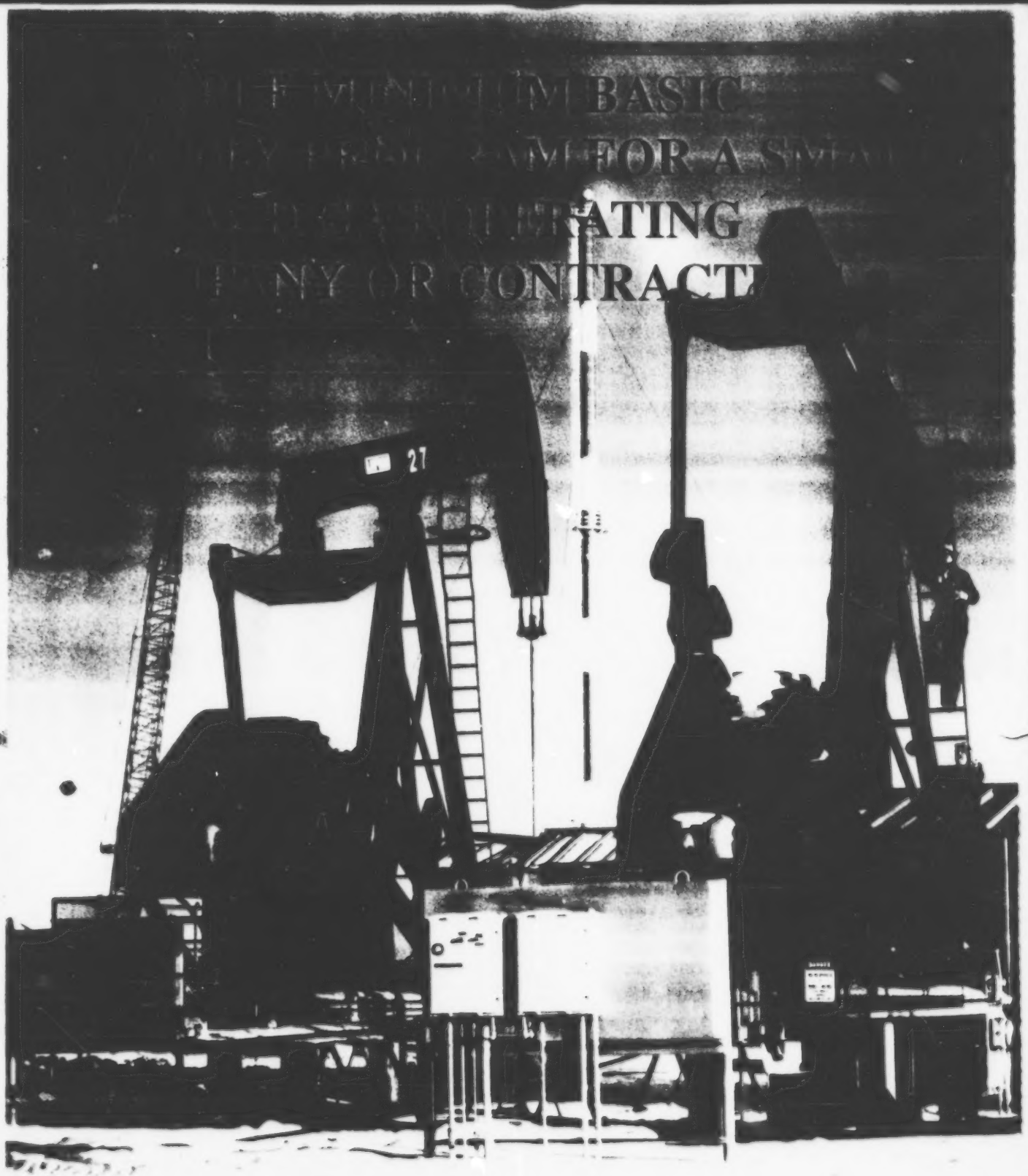
Details that should be reported include site and weather conditions, time of day, condition of equipment and worker prior to and following accident, actual circumstances of accident, all factors which may have contributed to it and specific details regarding any injuries received by workers or bystanders.

2. Accident Investigation and Follow-up

Accident investigation and follow-up are used to help prevent future recurrences of accidents and to identify procedures and controllable conditions which can be modified to reduce hazards. This stage should include a review of all accident reports by top management and result in recommendations for improvements.

3. Loss Control Statistics

Accident statistics should be compiled and reviewed on a regular basis to determine the effectiveness of the safety program. These reports will also help determine types of accidents occurring, common causal factors, where they are occurring, high risk tasks, program needs, accomplishments and trends. The statistics must be reviewed by the company's most senior management.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IN CASE OF EMERGENCY

My name _____

My home telephone number _____

My next-of-kin _____

My doctor's name _____

My doctor's telephone number _____

My social insurance number _____

EMERGENCY TELEPHONE NUMBERS

1. Name _____ Tel. no. _____

2. Name _____ Tel. no. _____

3. Name _____ Tel. no. _____

4. Name _____ Tel. no. _____

5. Name _____ Tel. no. _____

6. Name _____ Tel. no. _____

7. Name _____ Tel. no. _____

CARRY THIS BOOKLET ON YOUR PERSON AT ALL TIMES

ACKNOWLEDGEMENT FORM

I have read and I understand the safety requirements summarized in this Safety Program.

I will comply with these safety requirements as well as those legislated by governments in whose jurisdiction I am working. By doing this, I will help to prevent injury to both myself and my fellow workers.

SIGNATURE	SUPERVISOR'S SIGNATURE
POSITION	POSITION
COMPANY NAME	DATE / HANDBOOK NO.

Please complete, tear off and send this portion to the address below:

SAFETY PROGRAM
ACKNOWLEDGEMENT FORM

SIGNATURE	SUPERVISOR'S SIGNATURE
POSITION	POSITION
LOCATION	LOCATION
COMPANY NAME	DATE / HANDBOOK NO.

Send to: Company name
Company address

Attention: Safety Coordinator/President

SAFETY AND LOSS CONTROL POLICY

This company is committed to a strong safety and loss control program that protects its staff, its property and the public from accidents. In addition to this commitment, management supports the industry-wide Guiding Principles for Worker Safety. These guidelines outline safety responsibilities for the industry.

Employees at every level, including management, are responsible and accountable for the company's overall safety initiatives. Contractors are also required to comply with all company safety policies and rules. Complete and active participation by everyone, every day, in every job is necessary for the safety excellence the company expects. Management supports coordination of safety among all workers and contractors on the job site and has posted the guiding principles.

Management supports participation in the program by all employees and provides proper equipment, training and procedures. Employees are responsible for following all procedures, working safely, and wherever possible, improving safety measures.

An injury and accident-free workplace is our goal. Through continuous safety and loss control effort, we can accomplish this.

_____

President

HOW TO USE THIS BOOKLET

This booklet presents an overview of the company's total safety program as well as every worker's responsibilities. Everyone must be familiar with the entire safety program to be able to work toward the same safety objectives.

This booklet is organized into six basic components:

A. Management Commitment and Involvement
B. Hazard Assessment and Control
C. Rules and Work Procedures
D. Training and Motivation
E. Communication and Group Meetings
F. Accident and Incident Investigation.

Various safety program activities are grouped within each component.

Component A describes the various ways management demonstrates its commitment and involvement in the safety program. Component B describes various workplace hazards and how to control them and Component C outlines company rules and work procedures. This information is used in safety training programs, which are described in Component D. Component E describes the procedures for communicating safety information on the job and Component F outlines how accidents are investigated, followed up and monitored.

The types of activities within each component may be adjusted to suit individual projects. For example, in some situations, hydrogen sulphide training may be required, and in others, pipeline safety may be a priority.

Familiarize yourself with the sections that apply to your work. Remember too that no safety book can include all necessary information. To the information contained herein, please add your own common sense.

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A. MANAGEMENT COMMITMENT AND INVOLVEMENT

This company's management is committed to safety excellence in every operation of the company. By working together, workers, contractors, supervisors and managers can keep the workplace accident free.

1. COMPANY POLICY STATEMENT

This commitment to safety is clearly outlined in the company's safety policy. This policy is included at the front of this booklet and is posted throughout the workplace to remind workers of the importance of safety.

2. GUIDING PRINCIPLES

Both operating companies and contractors have a responsibility for protecting all workers within the oil and gas industry. Five industry associations representing contractors and operating companies have joined forces to develop guiding principles that:

- outline each parties' responsibilities
- state safety is a high priority
- support recognition of good safety performance
- support promotion of methods and principles that have potential for improving safety

This company supports these guiding principles and has posted them at the work site.

3. SAFETY RESPONSIBILITIES

Listed below are the specific safety responsibilities for managers, supervisors, workers and contractors. When hiring contractors, these responsibilities are specified in the contract document. These responsibilities are also used to set standards for performance evaluation and future work.

Company Management

The company's management is responsible for:

- following all safety rules and procedures of both the company and government
- ensuring employees and contractors know of and follow safety procedures and work safely

Company Employees

Workers' responsibilities with respect to safety include:

- continuously improving work procedures and reporting any hazards
- adhering to the safety requirements in this booklet and to all other safety requirements

Contractors

Contractors are also held accountable for safety and meeting government regulations. The safety responsibilities of contractors include:

- cooperating with the company and any other contractors in providing a safe workplace
- following the information in this booklet and all government safety regulations
- ensuring they and their subcontractors follow safe work practices

4. MANAGEMENT COMMUNICATION

Company management provide and ensure safety direction to employees through policies, safety meetings and other communications. Management also conducts walk-arounds on the work site to observe operations and talk to employees about safety concerns. Any employee can present concerns to senior management during these walk-arounds.

5. SAFETY PROGRAM EVALUATION

Both senior management and supervisors periodically evaluate the company's safety program to ensure it is effective and goals are being met. Areas for improvement are also identified.

All of the areas discussed in this safety program are reviewed, e.g., purchasing, engineering, work methods, supervisor and employee performance, inspection results, management commitment and safety records. As well, any new safety technology and procedures are assessed and, if suitable, incorporated into the company's safety program.

B. HAZARD ASSESSMENT AND CONTROL

Recognizing potential hazards and taking steps to control them is a major part of the company's safety program. This component of the program requires the full participation of all employees, supervisors and management, who must take responsibility for identifying and attempting to control the hazards within their work areas. The following activities are integral to assessment and control:

1. INSPECTIONS

Supervisors and employees must conduct regular inspections of equipment, work site conditions, employee actions and job procedures to identify potential hazards. Rig safety inspections are done cooperatively with both the operating company and the contractor, using the standards set out by industry associations.

2. HAZARD REPORTS

Employees should promptly submit reports of any hazards observed on the work site. Hazardous conditions are rectified quickly by management before they cause problems and accidents.

3. EQUIPMENT PREVENTIVE MAINTENANCE

Proper equipment maintenance is a preventive measure against accidents and costly breakdowns. The company has a detailed program with checklists for pre-shift equipment checks, maintenance manuals and maintenance procedures.

Supervisors are to ensure that company equipment have preventive maintenance manuals and that proper maintenance is done and recorded. Supervisors must also check the condition of rented equipment and request any necessary maintenance.

Operators of equipment are responsible for bringing any equipment or machine deficiencies to the supervisor's attention.

4. PURCHASING CONTROLS

The company has written standards for purchasing materials and renting equipment. Specific controls are defined for hazardous materials, which take into account all applicable government regulations.

Only certified personal protective equipment is purchased. Company purchasers ensure no unsafe equipment is purchased, rented, or operated on any company site.

5. ENGINEERING CONTROLS

Any materials, equipment, parts, machinery, facilities and processes must meet or exceed government requirements, any other company engineering standards, and standards prepared by institutes such as the following:

- Canadian Standards Association
- American National Standards Institute
- American Petroleum Institute
- National Fire Protection Association
- Occupational Health and Safety
- Energy Resources Conservation Board

Any other standards for particular pieces of equipment or types of work are also followed.

When designing facilities or equipment, the design and construction engineer avoids tripping hazards, fire and explosion hazards and the possibility for chemical and gaseous leaks. Adequate safety factors and standards are built into every facility. After facilities have been built, as-built drawings are kept current so any modifications can be easily planned.

6. SAFETY AUDITS

The company's work sites and procedures are periodically audited by to measure the effectiveness of the safety program and to ensure it is being used correctly. The results are measured against an agreed standard or an established base line, such as a previous audit. Audits are kept on file for at least five years.

7. HAZARD CONTROL

All hazards on oil and gas sites can be controlled by using properly designed and maintained equipment, safe operating procedures, properly trained workers and personal protective equipment.

Several hazards and procedures to control them are listed below. This list should be expanded to cover all types of work on a specific job site. The use of personal protective equipment is discussed on page 88.

Compressed Gas Handling

The following are examples of safe procedures for handling compressed gases:

- do not drop or strike cylinders or allow them to strike each other
- when moving cylinders, roll them on their bottom end. Do not drag them.
- for lifting cylinders, use special cages, which have completely enclosed sides and secure tops
- do not use cylinders as rollers, jacks or work supports
- use approved regulators on cylinders. Do not attempt to use modified fittings or adapters as they may leak.
- do not bump or lay acetylene cylinders horizontal

Equipment Safety Devices

Legislated equipment safety devices must be in place at all times. Some of these devices include safety catch hooks, backup horns, grinder guards, rollover protective devices, locking devices and brakes, lights, and positive-air shutoffs.

Flammable Materials

Many precautions must be taken to prevent fires of flammable materials. Everyone has a personal responsibility to undertake these precautions:

- obey all smoking restrictions
- do not handle flammable material near an open flame or any source of ignition
- use only portable containers with flame arresters
- keep flammable liquids only in approved containers; do not dump them down drains or sewers
- do not use gasoline as a cleaning fluid
- dispose of rags soaked with combustible liquids in covered metal containers
- wear fire-resistant work wear

Materials Handling

Materials must be handled properly to avoid accidents and property damage. The most frequent problems involve machines used in storing and piling materials.

Hazardous Goods: Hazardous goods must be handled safely according to the following government regulations: transportation of dangerous goods regulations and workplace hazardous materials information system regulations. These regulations require that hazardous goods be properly labelled, packaged, handled and transported.

Transferring Materials: When transferring dusts or liquids from one container to another, attach a bond wire between the two containers. This eliminates the difference in electric potential created by the flow of material, and the possibility of a spark jumping between the two containers and causing a fire.

Stacking Materials: Materials must be stacked properly to prevent them from falling over and hurting someone. Never store materials where they will block walkways, exits, ladders, or safety and fire protection equipment. Tie down bags of supplies and chock stacks of pipe.

Powered Mobile Equipment

Many components of powered mobile equipment must be inspected regularly to ensure safe operation. These components include stopping devices, lifting equipment, warning devices, lights, windshield wipers, rollover protective devices, seats and seat belts, backup alarms, bulkheads, and fuel tank vents. On-site supervisors are responsible for ensuring these inspections are regularly completed.

An operator of powered mobile equipment is responsible for its safe operation. Operator guidelines are as follows:

- always operate equipment within its rated capacity and according to the manufacturer's instructions
- watch the movements of all nearby equipment and people
- do not take a ride or allow anyone to ride on any mobile equipment
- do not exceed posted speed limits

When walking or working near mobile equipment, always keep an eye on which direction it is moving. Get the operator's attention before approaching the equipment and never work directly behind moving equipment.

Powerline Clearances

To avoid contact with powerlines, equipment and workers must not approach powerlines from any direction closer than the limits below:

Voltage (V)	Limit of Approach (ft.)	Limit of Approach (m)
0 - 5 000	6	2.0
5 000 - 50 000	10	3.0
50 000 - 250 000	15	4.5
Over 250 000	20	6.0

Power Tools

The following are safety precautions for operating power tools:

- use explosion-proof equipment whenever possible
- check for defective cords and have any replaced. When using an extension cord, use one long length rather than several short lengths attached together.
- use only grounded plugs
- if using a power tool in a wet area, ensure all equipment insulation is sound, wear rubber gloves, and use insulating platforms. These measures will lessen the effect of electric shock. The risk of electric shock in a wet area is not greater, but the effects of electric shock are more severe.
- shut off the power to tools anytime you must leave them, even if only for a short time. In the case of pneumatic tools, release the air pressure from the air line before leaving them.

Be sure to follow all manufacturer's specifications and do not tamper with or remove any safety devices.

Safe Work Permit System

The company has a safe work permit system, which specifies the safety precautions to be taken when certain types of potentially hazardous work are being undertaken. The types of safe work permits are:

- hot work permit
- cold work permit
- maintenance work permit
- vehicle entry work permit

Before beginning any work, find out whether a safe work permit is required. Permits are valid only for the job to be done and only for a specific length of time or shift end, whichever comes first.

C. RULES AND WORK PROCEDURES

Complete and detailed rules and work procedures are important to both management and workers, and in some cases, are required by legislation. In addition to setting guidelines for performance, they also provide references for purchasing, training, engineering and emergencies.

1. SAFETY RULES

The company has specific rules regarding the wearing of respiratory protection, personal protective equipment, confined space entry, and appropriate clothing. Some of these policies are outlined throughout this booklet. The supervisor will review any other policies with employees.

One rule not covered elsewhere is the one regarding the use of illegal drugs or alcohol. Anyone using these substances on the site or reporting to work under their influence will be removed immediately from the job site and may face disciplinary action, possibly including dismissal from the company.

2. LEGISLATION COMPLIANCE

All applicable occupational health and safety and worker compensation legislation must be followed. Examples of pertinent legislation are occupational health and safety acts, workers' compensation board acts, provincial fire codes, energy resources conservation board regulations, transportation of dangerous goods regulations and the workplace hazardous materials information system. Supervisors must notify employees of these requirements and should review regulations for each specific job with employees.

In some cases, the company may also stipulate site-specific precautions. These precautions are also to be followed.

3. STANDARD WORK PROCEDURES

Each job must be done according to standard work procedures specified by the company. These procedures encourage consistent work with maximum efficiency and safety. Written procedures are available for some key or potentially hazardous jobs, for example, vessel entry. Employees are encouraged to provide input into the development and maintenance of procedures.

If you do not know how to do a job or operate a piece of equipment, DO NOT GUESS or TAKE A CHANCE. Consult your supervisor for safe procedures before starting the work.

4. PERSONAL PROTECTIVE EQUIPMENT

CSA-approved safety boots with safety shank and non-canvas uppers and CSA-approved hats **must be worn by all personnel and visitors on company sites**. This requirement is consistent with government regulations and is required for safe operations.

Before starting a job, consult the supervisor for any additional protective equipment such as the following:

- gloves when handling sharp objects
- goggles and face shield when doing jobs where flying objects could harm the eyes

- fire-resistant work wear when handling flammable materials
- hearing protection for work environments with noise levels greater than 85 dBa
- breathing apparatus for toxic environments
- dust masks for silica protection
- chemical suits when mixing chemicals

The company supplies necessary personal protective equipment for its employees and trains them in how to wear, fit, clean and store protective equipment.

Contractors and subcontractors are responsible for providing and maintaining personal protective equipment for their employees.

Supervisors are responsible for ensuring employees and contractors are aware of and use the protective equipment and clothing required for each job.

5. RULES AND PROCEDURES ENFORCEMENT

The company expects all employees will follow all company and government safety rules.

Safety rules and procedures are enforced first through proper orientation and communication of all rules and procedures, and second, through disciplinary measures that will be taken against those who fail to comply with them. The company's disciplinary program is a positive one, including skill development, retraining and commendations as well as punitive actions when necessary.

6. JOB SAFETY ANALYSIS AND OBSERVATION

Job analysis and observation help to eliminate hazards before they cause problems. Teams of supervisors and employees regularly observe the job-site and work practices to assess the safety of operations and determine where improvements are needed.

Shortcuts can be dangerous so the company continually encourages safe and efficient work practices.

7. EMERGENCY PROCEDURES

The company has emergency response procedures for possible emergencies. These procedures are posted in highly visible areas on work sites. The procedures outline specific employee responsibilities, evacuation, medical attention, emergency contacts, location of fire-fighting equipment, shut-down procedures, protection of vital records, and compliance with any legislated emergency procedures such as in the case of critical sour wells and gas plants. Lists of emergency telephone numbers are also provided.

D. TRAINING AND MOTIVATION

Training is an important part of the company's safety program. It motivates employees, provides necessary skills, explains the need for safe operations, enhances communication and gives the confidence necessary to do the work properly and safely. Training includes management training, supervisor training and worker training. Worker training includes a safety orientation when first working for the company or starting on a new work site and on-the-job training. Special training is provided for critical tasks, such as the use of hazardous materials.

1. MANAGEMENT TRAINING

Just as every supervisor and every employee is held accountable for safety, so is company management. Company managers are trained on effective management of the company's safety programs. Managers keep up to date by attending regular safety seminars when they are available.

2. SUPERVISORY TRAINING

Supervisors are trained in overseeing and managing technical work, including all procedures and components of their respective safety programs. They are also trained in regulatory requirements and hazard recognition to be able to proper-

ly conduct inspections and safety audits. For training others through job-site orientations and on-the-job training, supervisors are given training in interpersonal communication.

3. WORKER TRAINING COURSES

Workers are trained in work and safety procedures, hazard identification and control, first aid, fire training, the use of personal protective equipment and emergency procedures. They are also trained as necessary for specific types of work, such as safe driving, transportation of dangerous goods, cold weather survival, confined space entry, respiratory protective equipment and H_2S training.

Some of this training is provided through orientations or on-the-job training (see sections 4 and 5 below) and some is provided through formal training courses.

The minimum first aid requirement for supervisors is a standard first aid certificate. CPR training is also recommended. Large jobs with many workers may require more highly trained persons.

4. SAFETY ORIENTATION

Every employee and contractor employee who is new to a work site will receive an orientation to the site (at least one hour long). The safety orientation includes a review of company policies and procedures and other instructional materials available to employees; specific job hazards; safety precautions; contractor, supervisor and employee safety responsibilities and expectations; government regulations; the company discipline policy and a worker's right to know and to refuse to perform unsafe acts on the job.

Following this, a site walk-through will be given, as well as discussion of the locations of personal protective and first aid equipment. Company sign-on and payroll procedures are discussed and personal protective equipment (boots, hard hat, etc.) are issued.

Further orientation and training sessions are given by the supervisor before the employee starts new types of work.

5. ON-THE-JOB TRAINING

After the initial orientation, employees receive regular on-the-job training. On-the-job training gives "hands-on" experience in the procedures specific to the safe completion of tasks. In addition, on-the-job training allows supervisors to refresh their workers' previous training by repeating information they learned earlier. On-the-job training may be given at regular pre-job meetings.

If you are uncertain on how to do a job safely, DO NOT GUESS OR TAKE A CHANCE. CONSULT YOUR SUPERVISOR FOR SAFE PROCEDURES BEFORE STARTING THE WORK.

6. TRAINING RECORDS

In order to ensure training is kept up-to-date, detailed records of participants, topics, dates, materials provided and follow-up programs are kept. Supervisors use this information in meeting regulatory requirements, planning future training programs, assessing the effectiveness of past programs and assessing individual employee safety performance.

7. SAFETY AWARDS

The company has a safety award program, which rewards employees with no lost-time accidents and no preventable motor vehicle accidents. Both office workers and field workers are included. See your supervisor for details.

E. COMMUNICATION AND GROUP MEETINGS

Effective communication between all levels of employees is necessary to monitor and improve work procedures and safety. The activities listed below can be used to ensure good communication. As well, supervisors receive training in interpersonal communication to improve their effectiveness in conducting on-the-job training.

1. SAFETY MEETINGS

Depending on circumstances, safety meetings are held daily, weekly or monthly. A combination of these can be effective in order to cover immediate and long-term safety concerns. Pre-job, or tailgate meetings, can be used to discuss safety concerns specific to the particular job at hand. Safety meetings can also be used for additional training and to encourage worker input and communication.

Meetings are held both by field workers in the field and by managers and engineers at head office.

Topics covered in safety meetings include review of a recent accident and safety precautions to prevent its reoccurrence, new safety procedures and materials, new policies, or new technology. These meetings are tailored to the specific needs of the location and scheduled to allow for open discussion.

Attendance records and minutes of these meetings must be sent to head office for review and recording. Minutes of the meetings are posted or circulated.

2. JOINT WORK SITE HEALTH AND SAFETY COMMITTEE

Depending on the work site, government may require a joint work site health and safety committee be established to discuss safety procedures and hazards. This committee is made up of workers and supervisors.

3. HEALTH AND SAFETY POSTERS

The company displays posters around the work site to provide visual reminders about the importance of good health and safety practices.

F. ACCIDENT INVESTIGATION AND ANALYSIS

Management investigates and analyzes every accident to determine corrective actions to prevent recurrences. Accident investigation involves determining the underlying causes of the accident and specifying what actually happened. Analysis is an overall study of accident types, frequencies, locations and common causes. It also involves identifying risk areas, safety needs and accident trends, to determine where improvements are necessary.

1. INCIDENT AND ACCIDENT REPORTING

Every worker and contractor must immediately report all incidents, accidents and near-misses, no matter how small, to the supervisor, using the correct company form. Supervisors also report serious accidents and near misses to the proper government authorities.

Details that should be reported include site and weather conditions, time of day, condition of equipment and worker prior to and following accident, actual circumstances of accident, all factors which may have contributed to it and specific details regarding any injuries received by workers or bystanders.

2. ACCIDENT INVESTIGATION AND FOLLOW-UP

A team of individuals investigates all accidents and recommends changes to the work procedures or work site conditions that will help prevent future recurrences of accidents. Senior company management reviews all accident reports.

3. LOSS CONTROL STATISTICS

Accident statistics are maintained and reviewed on a regular basis to determine the effectiveness of the safety program. These reports are also used to help determine types of accidents occurring, common causal factors, where they are occurring, high risk tasks, program needs, accomplishments and trends. The statistics are reviewed by the company's most senior management.

REVISION REQUEST FORM

The company welcomes suggestions to this booklet. To suggest a revision, fill out this form and submit it to either the supervisor on site or to:

The company's address

Telephone:

I suggest the following revision (insertion, deletion, or change of wording) to the Safety Program:

Page number: _____

Heading: _____

Suggested Revision: (attach additional pages, if necessary):

_____

_____

_____

_____

Name Position

_____

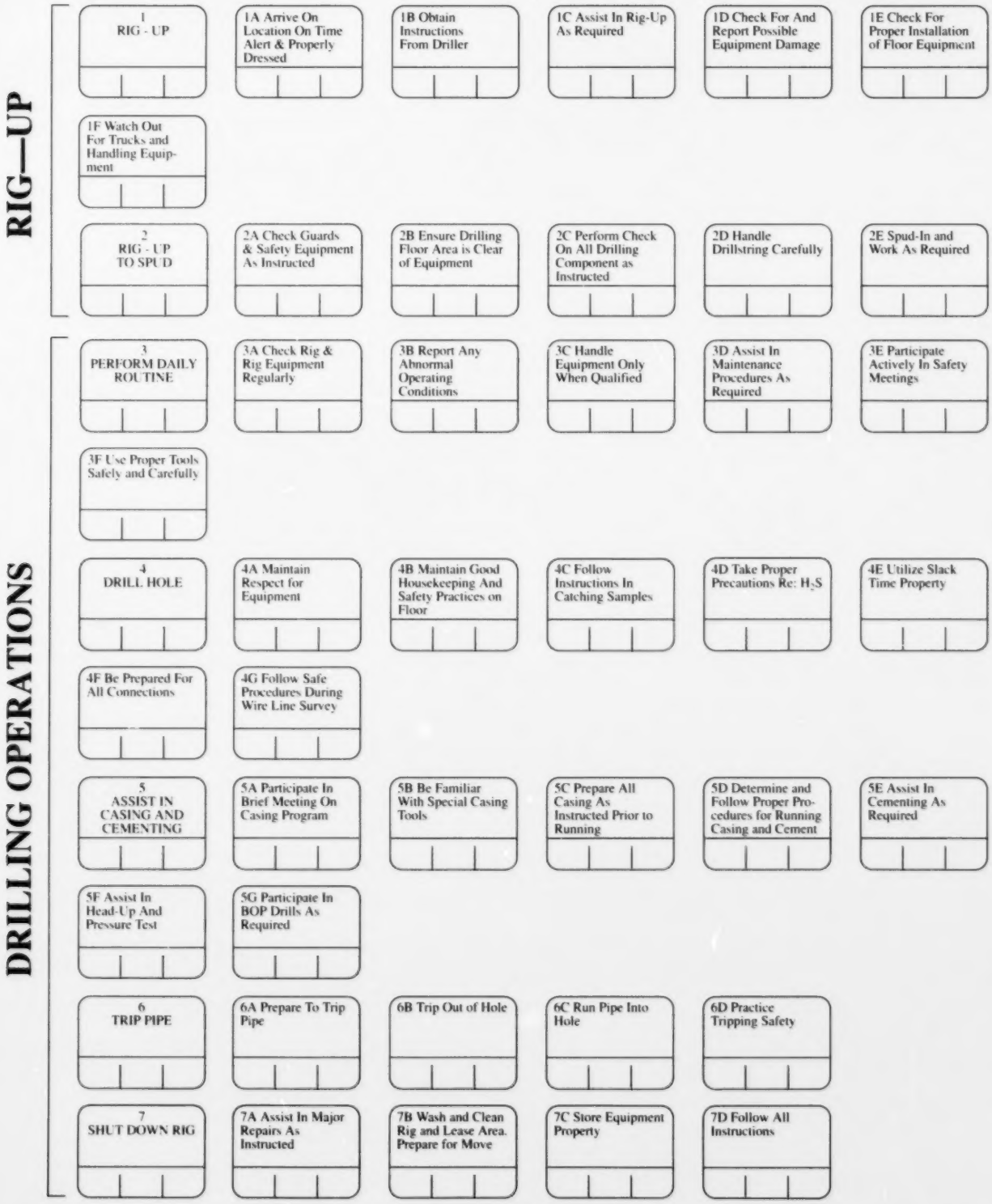
Sigature Date

_____

COMPARISON OF SAFETY PROGRAM TO COMMERCIAL SAFETY PROGRAMS

TASK FORCE PROGRAM	Du Pont	ILCI	OH&S	ERCB	D.PETERSEN	WCB of BC
A. Management Commitment & Involvment						
1. Company Policy Statement	X	X			X	X
2. Guiding Principles						
3. Safety Responsibilities	X	X	X	X	X	X
4. Management Communication	X	X			X	
5. Management Walk-Arounds	X	X			X	
6. Safety Program Evaluation	X	X			X	
B. Hazard Assessment and Control						
1. Inspections	X	X			X	X
2. Hazard Reports	X	X			X	X
3. Equipment Preventive Maintenance	X		X		X	
4. Purchasing Controls	X	X				
5. Engineering Controls	X	X	X	X	X	
6. Safety Audits	X	X				
C. Rules and Work Procedures						
1. Safety Rules	X	X	X	X		
2. Legislation Compliance	X	X	X	X	X	X
3. Standard Work Procedures	X	X	X	X	X	X
4. Personal Protective Equipment	X	X	X	X	X	X
5. Rules and Procedures Enforcement	X	X	X	X		X
6. Job Safety Analysis and Observation	X	X			X	
7. Emergency Procedures	X	X	X	X	X	
D. Training and Motivation						
1. Management Training	X	X			X	
2. Supervisory Training	X	X	X	X	X	
3. Worker Training Courses	X	X	X		X	
4. Safety Orientation	X	X	X		X	
5. On-the-Job Training	X	X	X		X	
6. Training Records	X	X			X	
7. Safety Awards	X	X			X	
E. Communication and Group Meetings						
1. Safety Meetings	X	X	X		X	X
2. Joint Work Site Health & Safety Committee			X		X	X
3. Health and Safety Posters	X	X				
F. Accident Investigation and Analysis						
1. Incident and Accident Reporting	X	X	X	X	X	X
2. Accident Investigation and Follow-Up	X	X	X	X	X	X
3. Loss Control Statistics	X	X	X	X	X	X

APPENDIX F: TASCAN ON-THE-JOB TRAINING PROGRAM – SAMPLE DRILLING RIG TASK ANALYSIS – FLOORHAND


RIG—UP
1 RIG - UP
1A Arrive On Location On Time Alert & Properly Dressed
1B Obtain Instructions From Driller
1C Assist In Rig-Up As Required
1D Check For And Report Possible Equipment Damage
1E Check For Proper Installation of Floor Equipment
1F Watch Out For Trucks and Handling Equipment
2 RIG - UP TO SPUD
2A Check Guards & Safety Equipment As Instructed
2B Ensure Drilling Floor Area is Clear of Equipment
2C Perform Check On All Drilling Component as Instructed
2D Handle Drillstring Carefully
2E Spud-In and Work As Required
DRILLING OPERATIONS
3 PERFORM DAILY ROUTINE
3A Check Rig & Rig Equipment Regularly
3B Report Any Abnormal Operating Conditions
3C Handle Equipment Only When Qualified
3D Assist In Maintenance Procedures As Required
3E Participate Actively In Safety Meetings
3F Use Proper Tools Safely and Carefully
4 DRILL HOLE
4A Maintain Respect for Equipment
4B Maintain Good Housekeeping And Safety Practices on Floor
4C Follow Instructions In Catching Samples
4D Take Proper Precautions Re: H_2S
4E Utilize Slack Time Property
4F Be Prepared For All Connections
4G Follow Safe Procedures During Wire Line Survey
5 ASSIST IN CASING AND CEMENTING
5A Participate In Brief Meeting On Casing Program
5B Be Familiar With Special Casing Tools
5C Prepare All Casing As Instructed Prior to Running
5D Determine and Follow Proper Procedures for Running Casing and Cement
5E Assist In Cementing As Required
5F Assist In Head-Up And Pressure Test
5G Participate In BOP Drills As Required
6 TRIP PIPE
6A Prepare To Trip Pipe
6B Trip Out of Hole
6C Run Pipe Into Hole
6D Practice Tripping Safety
7 SHUT DOWN RIG
7A Assist In Major Repairs As Instructed
7B Wash and Clean Rig and Lease Area. Prepare for Move
7C Store Equipment Property
7D Follow All Instructions

APPENDIX G:

NEW EMPLOYEE ORIENTATION PROGRAM — SAMPLE

1. ADMINISTRATION

A. i. T1 forms
ii. Application form
iii. Health care form

B. i. Introduction to drilling
ii. Pay information
iii. Shift and time off information
iv. Travel and subsistence allowance policy
v. Safety policy
vi. Company policy

2. WORK ENVIRONMENT

A. Work hazards — fire, explosion, H_2S, pressure lines, heavy equipment

B. Attitude to work — hard way, easy way, learn before trying, do as directed, major jobs are only for experienced men, tidy up

C. Personal — alcohol, drugs, rest, hair and beards, smoking, camp rules

D. Personal protection — gloves, hard hats, boots, goggles, breathing equipment, first aid, etc.

E. Line of authority — toolpush to new employee

3. WORK SITE AND CAMP TOUR

4. INTRODUCTION TO CREW

5. DISCUSSION WITH DRILLER AND NEW EMPLOYEE

6. SIGN OFF

_____ _____

SUPERVISOR NEW EMPLOYEE

NEW EMPLOYEE ORIENTATION — RIG TOUR CHECKLIST

CONTRACTOR _____ OIL COMPANY _____

NEW EMPLOYEE _____ RIG MANAGER _____

POSITION _____

A. RIG FLOOR

1. Explain tripping and running casing (purpose and explain main responsibilities of the driller, derrickhand, motorhand and floorhand ( )
2. Rotary table (purpose, hazards) ( )
3. Areas where employees should and should not stand and why ( )
4. Drill pipe (handling, hazards) ( )
5. Slips (purpose, lifting and placement) ( )
6. Drill collars (purpose, review parts, explain stabbing valve) ( )
7. Spinning chain (purpose, left hand, tailing, clothing, hazards) ( )
8. Tongs (handling, latching, setting, jaw selection, hazards) ( )
9. Elevator, bails (purpose, hazards) ( )
10. Cathead (purpose, emergency stop, coil rope, hazards) ( )
11. Winch and hookup of cable ( )
12. Kelly and kelly hose (kelly cock and wrenches) ( )
13. Rathole and mousehole ( )
14. Changeover and pickup subs ( )
15. Wireline reel and survey instruments ( )

B. DOGHOUSE

1. Tour sheet (explain purpose and use) ( )
2. Location and proper use of safety equipment (first aid kit, goggles, safety belts, lanyards and fire extinguisher) ( )
3. Fire signal and evacuation procedures ( )
4. Hand tools (use, condition, cleanliness, storage) ( )
5. Safety Policy and Procedures Manual (review) ( )

C. PIPE RACKS AND CATWALK

1. Handling drill pipe (describe procedure and hazards) ( )
2. End stops (proper placement and service) ( )
3. Spacers (sturdy and secure) ( )
4. Chocking (layers and ends) ( )
5. Drill collar protectors (purpose) ( )
6. Catwalk (how to sling pipe and hook up to catline) ( )
7. General maintenance ( )

D. MUDSYSTEM, TANKS, SHALE SHAKERS, MUD PUMPS, HOPPERS, BOPs, ETC.

1. Shale shaker (explain function and taking samples) ( )
2. Degasser (function and hazards) ( )
3. Mud tank system (explain valves and gauges) ( )
4. Desander and desilter (function) ( )
5. Caustic barrel (hazards, clothing, proper procedure, safety shower) ( )
6. Pressure relief discharge lines (location and hazards) ( )
7. Mud (purpose, storage, handling, hazards, safety precautions) ( )
8. Premix pumps (describe usable valves and hazards) ( )
9. Mud pumps (purpose, hazards — pop valves, motors, drive belts, guards, piston and rods) ( )
10. General discussion on hoses, pipes and fluids under pressure ( )
11. Blowout preventers (purpose and hazards) ( )
12. Exits (location of exits) ( )

E. AUXILIARY FACILITIES

1. Accumulator (purpose and emergency shutdowns) ( )
2. Change room (locker, housekeeping) ( )
3. Light plant (purpose, high voltage, fire extinguisher location, self-contained breathing apparatus) ( )
4. Tool room (location of tools, housekeeping, parts bins, face shield) ( )
5. Water and fuel tanks (location and purpose) ( )
6. Boiler (purpose, hazards — hot steam pipes and heaters) ( )
7. Engine room (motorhand responsibilities, hazards — mechanical, hot exhaust pipes, exhaust water connections, air compressors, compounds) ( )

F. CAMP TOUR

1. Change in change shack in rig ( )
2. Boots off in hall ( )
3. Quiet for offshift personnel ( )
4. Meal hours (cleanup) ( )
5. Fire extinguisher location ( )
6. Fire procedures ( )
7. Parking rules ( )
8. Use of washers (heavy dirt out at rig first) ( )

I, _____ hereby acknowledge I have completed the above rig tour and understand I must have a thorough knowledge and abide by the instructions and practices outlined to me.

_____ Rig Manager's Signature

_____ New Employee's Signature

_____ Date

APPENDIX H: RIG INSPECTION CHECKLIST — SAMPLE

Contractor _____ Rig No. _____ Date _____

Lease Location _____ Well No. _____

Inspected By _____

Drilling Foreman _____ Signature _____

Rig Manager _____ Signature _____

Critical Sour Well (Y/N) _____

Inspection Code: Adequate ( ) Inadequate (X) Not Applicable (—)

1. Boiler House

a) No Clothing, etc. ____
b) Sight Glass Guarded ____
c) Pump Guarded ____
d) Fire Extinguisher ____
e) Safety Valves ____
f) Boiler 25 m from Wellhead ____
g) Housekeeping ____

2. Fuel Tanks(s)

a) No Leaks ____
b) Pumps Guarded ____
c) Fuel Sign ____

3. Water Tanks(s)

a) No Leaks ____
b) Pumps Guarded ____

4. Light Plant and Miscellaneous

a) Properly Grounded ____
b) Wiring off the Ground & Properly Secured ____
c) No Clothing/Storage ____
d) Fan & Belts Guarded ____
e) No Fuel/Oil Leaks ____
f) Compressor Guarded ____
g) Electrical Signs ____
h) Auto Start Sign ____
i) Fire Extinguisher ____
j) All Lights Protected ____
k) Housekeeping ____

5. Accumulator House

a) No Leaks/Spillage ____
b) N_2 Cylinders (1500 psi) ____
c) Unnecessary Storage ____
d) Housekeeping ____
e) BOP Sign Installed ____

6. Mud Pump Area

a) Pop Valve Shear Pin ____
Correct Size & Length ____
b) Pop Valve Cover in Place ____
c) Guards in Place and in Good Repair ____
d) Hose Safely Chained ____
e) Housekeeping ____
f) Fire Extinguisher ____

7. Mud Tanks Area

a) Shale Shaker Guards ____
b) Handrails, Walkways ____
c) Adequate Ventilation ____
d) Adequate Lighting ____
e) Eye Protection Available ____
f) Personal Protective Equipment ____
g) Housekeeping ____

8. Tool House

a) Grinder Tool Rest ____
b) Grinder Sign ____
c) Monogoggles ____
d) Equipment ____
e) Fire Extinguisher ____
f) Housekeeping ____
g) Compressor Guarded ____

9. Substructure

a) General Repair ____
b) Matting Condition ____
c) Drive Pins Installed ____
d) Safety Pins Installed ____
e) Spreaders in Place ____
f) Vent Doors/Fan ____
g) Illumination ____
h) Winterized ____

10. BOPs

a) BOP & Rig Equipment Conform to Government Regulations ____

11. Manifold/House

a) Heated ____
b) Valve Handles Installed ____
c) Proper Gauges Installed ____
d) Unobstructed View ____
e) Housekeeping ____

12. Pipe Rack Area

a) Catwalk in Good Condition ____
b) V-Door Ramp in Good Condition ____
c) Pipe Racks Level ____
d) Pipe Rack Ends Properly Pinned ____
e) Spacer Between Racks Sturdy and Secure ____
f) Derrick Stand in Good Condition ____

13. Doghouse

a) Heated as per Regulations ____
b) Toolboards/Tools ____
c) Bulletin Board ____
d) Blowout Procedure Posted & Readable ____
e) First-Aid Kit Stocked & Clean ____
f) Clear Water for Eye Wash ____
g) Safety Belts ____
h) Drilling License Posted ____
i) Fire Extinguisher ____
j) No Smoking Sign ____
k) Hard Hat Sign ____
l) Ear Protector Sign ____
m) Housekeeping ____

14. Derrick

a) Bumper Blocks ____
b) Fingers Straight ____
c) Fingers Chained ____
d) Wind Board Installed ____
e) Ladder, Condition ____
f) Escape Line Installed ____
g) Escape Buggy Installed ____
h) Climbing Device/Cages ____
i) Derrickhand's Belt ____
j) Guy Lines/Outrigger ____

15. Rig Floor

a) Drawworks Guard ____
b) Crown Saver (Check) ____
c) Drilling Line Condition ____
d) Catline ____
e) Catline Divider & Spools ____
f) Spinning Chain & Lines ____
g) Headache Post ____
h) Kelly Cock Condition ____
i) Kelly Hose Condition ____
j) Kelly Hose Safety Line ____
k) Weight Indicator Safety Line ____
l) Line Spooler Safety Line ____
m) Back-Up Posts ____
n) Tongs — Condition ____
o) Tong Lines ____
p) Line Clamps ____
q) Slips — Condition ____
r) Dog Collar — Condition ____
s) Stabbing Valve ____
t) Test Plugs ____
u) Mud Can ____
v) Drilling Controls & Identification ____
w) Floor & Motor Area Housekeeping ____
Motors:
i) Fans & Belts Guarded ____
ii) No Fuel/Oil Leaks ____
iii) Motor Shut-Off ____
iv) Stairs (min. 3 exits) ____
v) Warning Horn Working ____
vi) Fire Extinguisher ____
vii) Hydromatic & Covers ____
viii) Exhaust System ____

16. Safety — General

a) Directional Rig Signs ____
b) All Electrical Lines Up ____
c) Rig Lights & Vapour Globes ____
d) Air Packs — Condition ____
e) Spare Cylinders ____
f) Toxic Gas Detector & Tubes ____
g) Toe Board (where required) ____
h) Hearing Protection for Each Person ____
i) Stretcher ____
j) Condition of Hand Rails & Stairs ____
k) Emergency Phone Numbers Posted ____

17. Camp — General

a) Location — Distance, etc. ____
b) Garbage Disposal ____
c) Walkways ____
d) Kitchen First-Aid Kit ____
e) Kitchen Fire Exit ____
f) Fire Extinguishers (3) ____
g) Light Plant:
i) Grounded ____
ii) No Clothing, Storage ____
iii) No Fuel/Oil Leaks ____
iv) Fire Extinguisher ____
h) Furnace Rooms:
i) Clean, No Extra Storage ____
ii) No Fuel Leaks ____
iii) Fire Extinguishers ____
i) Light Plant:
i) Properly Installed (4 m from building) ____
ii) No Leaks ____

18. Personnel

a) 2nd Line Ticket ____
i) Drilling Foreman ____
ii) Rig Manager ____
b) 1st Line Ticket — Driller ____
c) First Aid Certificate ____
d) H_2S Training ____
e) Boiler Certificate ____
f) Weekly Safety Meetings ____

Reference No. Lists of Hazards and Corrective Actions to be Taken

APPENDIX I: OCCUPATIONAL HEALTH AND SAFETY GUIDELINES FOR THE HANDLING AND TRANSPORTATION OF BULK SOUR PRODUCTS

1.0 Definitions for the purposes of these guidelines:

1.1 "Sour product" is defined as "liquid petroleum product or by-product, including produced water, which contains or may contain hydrogen sulphide (H_2S) in sufficient amounts that a worker may be exposed to more than the occupational exposure limit (as prescribed by the Chemical Hazards Regulation) during loading, unloading, gauging or handling the load."

The occupational exposure limits for hydrogen sulphide (H_2S) currently are:

10 ppm for 8 hours (time-weighted average)
15 ppm for 15 minutes (time-weighted average)
20 ppm ceiling limit

1.2 "Bulk" is defined as quantities of 454 litres or greater.

2.0 Where there is the potential for the product being handled or transported to be "sour"

i. the producer, or his agent, must notify the carrier

AND

ii. the carrier must notify his workers of the potential hazard of the sour product identified by the producer or his agent.

3.0 A person handling or transporting bulk sour product shall hold a valid certificate from the PITS H_2S "ALIVE" course, or other equivalent course acceptable to the Director of the Occupational Health and Safety Division.

4.0 A person handling or transporting bulk sour product shall ensure that appropriate shipping documentation and placarding is in place as required by law.

5.0 The driver of a vehicle driven to a site for the transportation of bulk sour product shall ensure that in the cab there is a checklist which identifies the precautions to be followed to ensure protection from hydrogen sulphide gas (H_2S).

5.1 The owner of the vehicle or the employer of the driver shall provide the checklist referred to in section 5.0.

6.0 Respiratory protective equipment, as required by Occupational Health and Safety Legislation, shall be available at a work site where sour products are handled and must meet the following criteria:

- is of a type that will maintain positive pressure in the face piece
- has a capacity of at least 30 minutes
- provides full face protection
- in the case of remote supplied air apparatus, is fitted with an auxiliary supply of respirable air of sufficient quantity to enable the worker to escape from the area in an emergency, and
- in the case of self-contained breathing apparatus, is fitted with an alarm warning

6.1 Where H_2S levels at the work site exceed 20 ppm, workers must wear the above-described breathing apparatus.

6.2 Where the producer or his agent intends that the carrier will provide and maintain necessary respiratory protective equipment, the details should be addressed in a contractual agreement.

TRUCKING INDUSTRY CHECKLIST FOR SOUR PRODUCT

The following guidelines have been prepared as a base for a company checklist of procedures for drivers transporting or handling bulk sour product. Each company should tailor the checklist to suit the company's operation.

1. PRE-TRIP CHECKLIST

- Do you have a valid hydrogen sulfide (H_2S) "Alive" Certificate or equivalent?
- Do you have appropriate placards?

Do You Know:

- the H_2S concentration of the product to be handled?
- where the breathing apparatus is located?
- the use, fitting and limitation of the breathing apparatus provided?
- if the breathing apparatus is operational?
- if the air supply is adequate?

2. UPON ARRIVAL AT THE SITE

- Check for wind direction before entering.
- Check for (and read) all posted signs.
- Check all breathing apparatus for operation.

3. LOADING AND UNLOADING

- While in attendance, remain up-wind whenever possible.
- Wear breathing apparatus when:
- coupling and uncoupling
- checking tank levels
- opening or closing hatches
- H_2S levels exceed 20 ppm

4. POST-TRIP CHECKLIST

- Does air supply need replenishing? If so, follow your company's procedures for refilling.
- Return and secure all breathing apparatus.
- Report any unsafe equipment in accordance with your company policy.

NOTE: If any of the required equipment is not present or not operational or if in doubt in any area of this checklist, ALWAYS FOLLOW YOUR COMPANY'S SOUR PRODUCT AWARENESS GUIDELINES.

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SUMMARY TABLE OF RECOMMENDATIONS

Recommendation	Objectives	Responsibility	Action
RECOMMENDATIONS FOR INDUSTRY AND GOVERNMENT			
MINIMUM BASIC SAFETY PROGRAM			
1. Introduction of a Minimum Basic Safety Program	To become a regulated requirement for all operating companies and contractors	Alberta Government	Add this new regulation to the OH&S Act
Program should include:			OH&S to enforce regulations through random audits
- Management Commitment and Involvement - Hazard Assessment and Control - Rules and Work Procedures - Training and Motivation - Communication and Group Meetings - Accident Investigation and Analysis		Task Force	Provide Basic Safety Program
		Industry associations	Make available copies of the program to their members
		Operating companies and contractors	Implement and audit safety programs on an ongoing basis
BIDDING PROCEDURES AND CONTRACTING TERMS			
2. Safety as a contractual requirement	To include review of bidders' safety records, policies and procedures	Operating companies	To give substantial weighting to contractors' safety history when evaluating bids
			To provide leadership in safe work practices
		Contractors	To supply required safety information with bids
INDUSTRY SAFETY IMPLEMENTATION COMMITTEE			
3. Formation of a committee to follow up task force recommendations	To form an Industry Safety Implementation Committee	CPA, SEPAC, IPAC PSAC and CAODC	Designate members from their Boards of Directors
		ERCB and OH&S	Agree to be represented on committee
		Proposed Safety Implementation Committee	Prepare terms of reference and work plan for implementation of recommendations; monitor implementation and safety statistics; address common safety issues; report to association boards of directors
4. Industry Safety Association	To be responsible for education, training information, statistics regulatory review and liaising with government, public relations, equipment safety standards, consulting, programming services, special awards, competitions and annual conferences	Proposed Safety Implementation Committee	To review merit and feasibility of introducing an industry safety association within three years
ACCIDENT REPORTING			

Recommendation	Objectives	Responsibility	Action
INSPECTIONS AND REGULATIONS			
9. Improve inspections	To increase qualifications of OH&S inspectors to include petroleum industry experience	OH&S	To provide upgrading for current inspectors lacking petroleum industry experience
			To begin hiring inspectors with experience in oil and gas drilling, operations or facility construction
10. Coordination of government inspections	To make inspections more effective	Government	Senior levels of all departments doing inspections to develop ways to reduce overlap and conflict
			Phase in coordinated inspections within 12 - 18 months
11. Increased inspections and assistance for companies with poor accident records	To utilize inspections as method for improving overall safety performance	OH&S and ERCB	Maintain a list of companies with safety performance records below industry average
			Provide additional assistance through increased inspections and record observations
			Assist companies by providing them with cause and prevention information whenever possible
			Shut down companies that make no effort to improve poor safety performance
12. OH&S to provide more leadership and consultation	OH&S inspectors to take on a proactive role	OH&S	Broaden scope of inspections to include audits of safety programs and procedures
			Advise on work methods to improve safety
			Ensure workers understand regulations
13. Revision of OH&S Statute and Regulations Manual	To be rewritten and made more useful to industry	OH&S	Change format, improve indexing, wording, grouping of information and cross-referencing
FUNDING CUTBACKS IN GOVERNMENT SERVICES			
14. Privatization of government services	To examine privatization of government services and ensure high standards are maintained	Proposed Safety Implementation Committee and government	Discuss any proposed cutbacks and privatization initiatives in General Safety Services Division, Alberta Labour, and OH&S
			Assess safety implications of privatization of any inspection departments before transferring services to private sector
15. OH&S to fund and conduct more training seminars	To take a more proactive role in training	Industry and OH&S	Meet and discuss training needs OH&S can provide
		OH&S	Organize and advertise more training seminars - including

Recommendation	Objectives	R
CERTIFICATION AND TRAINING		
21. Industry training preferable to further government certification	To respond to OH&S plan of action for more certification	I
22. Minimum training standards for supervisors	To establish minimum standards of safety training for supervisory personnel	I
23. On-the-job training programs	To be developed by each company	C
24. New employee orientation programs	To be conducted in all industry sectors	C
SAFETY AWARDS		
25. Employee safety performance awards	To develop an award program for individual employees to provide strong peer and employer recognition of safe work performance	
26. Company safety performance awards	To develop award programs for member companies	
RECOMMENDATIONS FOR SPECIFIC INDUSTR		
DRILLING — Drilling Rig Operations		
27. Regular safety inspections	To ensure regular	

	Responsibility	Action
ifications ctors to um industry	OH&S	To provide upgrading for current inspectors lacking petroleum industry experience To begin hiring inspectors with experience in oil and gas drilling, operations or facility construction
tions	Government	Senior levels of all departments doing inspections to develop ways to reduce overlap and conflict Phase in coordinated inspections within 12 - 18 months
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s to take on	OH&S	Broaden scope of inspections to include audits of safety programs and procedures Advise on work methods to improve safety Ensure workers understand regulations
and made ndustry	OH&S	Change format, improve indexing, wording, grouping of information and cross-referencing
atization of gces and dards are	Proposed Safety Implementation Committee and government	Discuss any proposed cutbacks and privatization initiatives in General Safety Services Division, Alberta Labour, and OH&S Assess safety implications of privatization of any inspection departments before transferring services to private sector
proactive	Industry and OH&S OH&S	Meet and discuss training needs OH&S can provide Organize and advertise more training seminars - including ones on OH&S legislation

Recommendation	Objectives	Responsibility	Action
CERTIFICATION AND TRAINING			
21. Industry training preferable to further government certification	To respond to OH&S plan of action for more certification	Industry	Establish monitoring standards for supervisors as outlined in Recommendation 22 Implement job/task observation system as described in Recommendation 28 Support training institutions (PITS, NAIT and SAIT) Operating companies to consider contractor training when awarding contracts
22. Minimum training standards for supervisors	To establish minimum standards of safety training for supervisory personnel	Industry	Each sector to establish minimum standards for supervisors and organize training programs in-house or through SAIT, NAIT or PITS
23. On-the-job training programs	To be developed by each company	Companies	Determine areas where training is needed Develop and incorporate standards into training system that allow easy promotion, monitoring and evaluation of worker performance
		Industry associations	Encourage development and use of on-the-job training programs among member companies
24. New employee orientation programs	To be conducted in all industry sectors	Operating companies and contractors	Develop job and work site orientation procedures and checklists for use during orientation of new employees
SAFETY AWARDS			
25. Employee safety performance awards	To develop an award program for individual employees to provide strong peer and employer recognition of safe work performance	Company managers	Research and develop their own programs from existing ones and worker input
26. Company safety performance awards	To develop award programs for member companies	Industry associations	Assess whether award programs would be meaningful to members and implement them if research is optimistic (particularly in those associations whose member companies are too small to have meaningful company safety awards)

RECOMMENDATIONS FOR SPECIFIC INDUSTRY SECTORS

DRILLING — Drilling Rig Operations

27. Regular safety inspections	To ensure regular inspections with	CAODC, CPA, IPAC, and SEPAC	Agree on general rig inspection checklist

Recommendation	Objectives	Responsibility	Action
EXPLORATION			
33. Safety training for seismic workers	To decrease injuries due to working on rough surfaces	CAGC	Expand program to include training in safe work practices Approach OH&S for information and assistance
FIELD CONSTRUCTION			
34. Greater availability of training for construction safety	To develop training programs specifically for the oil and gas field construction industry	Construction industry and OH&S	Develop courses pertinent to construction safety at various training institutions Determine availability of Heritage Grant funds
TRANSPORTATION — Pipeline Operations			
35. Adherence to basic operating and maintenance standards	To implement appropriate standards and safe work procedures	SEPAC, CPA and IPAC	Develop specific standards for safe work procedures for pipeline operations Develop and establish training programs for pipeline companies
TRANSPORTATION — Oilfield Trucking			
36. Formation of an Oilfield Trucking Association	To recommend and implement safety and operational standards in oilfield trucking	PSAC	Initiative for OTA has been started by PSAC and should be continued Invite all carrier companies to meetings on proposed association structure and objectives
37. Minimum training standards and courses to be established	To develop minimum training standards for the various jobs in this area	OTA	Establish minimum training standards for each position and determine availability of training resources and funding Request government funding to reinstate cancelled government training programs or develop new ones Promote courses to all members and arrange for travelling facilities for smaller oilfield centres
38. Industry and its oilfield truckers to improve work planning and operating standards	To level truckers' work loads as much as possible	OTA	Persuade members to improve advance planning, minimize rush jobs and level work loads
TRANSPORTATION — Production Fluids Trucking			
39. Associations to improve membership and commitment	To promote safety awareness among a broader spectrum of the trucking industry	OTA and ATA	Encourage production fluids truckers to join Provide information to members on safety regulations, practices and standards, and help members develop their own safety awareness programs

		Implementation Committee	and work plan for implementation of recommendations; monitor implementation and safety statistics; address common safety issues; report to association boards of directors			
4. Industry Safety Association	To be responsible for education, training information, statistics regulatory review and liaising with government, public relations, equipment safety standards, consulting, programming services, special awards, competitions and annual conferences	Proposed Safety Implementation Committee	To review merit and feasibility of introducing an industry safety association within three years			
ACCIDENT REPORTING						
5. Introduce new reporting methods	To improve accident reporting	Proposed Safety Implementation Committee, OH&S and WCB	Prepare new accident form to meet needs of both industry and government			
			Create classes specifically for each industry sector of upstream petroleum industry			
		WCB	Introduce new form			
6. Statistics accessibility	To expand data recorded and make it more accessible and useful to industry	Proposed Safety Implementation Committee	Aid government in designing computer software to analyze statistics and produce reports in a variety of formats			
		Government	Install new system by end of 1989 and publicize its availability to industry			
7. Accident frequency calculations	To begin using the same formula for calculating lost time accident frequency and severity	WCB, Alberta	Use formulas recommended in task force report			
			Approach Saskatchewan and B.C. to discuss standardizing formula across Western Canada			
		Associations	Promote use of these indices to member companies			
DRILLING AND SERVICING CYCLE						
8. Level highs and lows of industry cycle	To improve annual drilling cycle	Government	Revise incentive programs to minimize end-of-incentive rush			
		Industry	Encourage early planning for exploration to level the workload and provide contractors with longer term contracts			
		CPA, IPAC and SEPAC	Develop educational program for member companies on benefits of multi-well drilling contracts and levelling of drilling activity			
FUNDING CUTBACKS IN GOVERNMENT SERVICES						
14. Privatization of government services	To examine privatization of government services and ensure high standards are maintained	Proposed Safety Implementation Committee and government	Discuss any proposed cutbacks and privatization initiatives in General Safety Services Division, Alberta Labour, and OH&S			
			Assess safety implications of privatization of any inspection departments before transferring services to private sector			
15. OH&S to fund and conduct more training seminars	To take a more proactive role in training	Industry and OH&S	Meet and discuss training needs OH&S can provide			
		OH&S	Organize and advertise more training seminars - including ones on OH&S legislation			
		Industry	Increase its use of PITS			
16. OH&S to improve access to safety publications	To make safety publications more available	OH&S	Increase availability and number of copies of regulations procedures and safety publications			
17. Verification by OH&S of qualifications of of training companies and consultants it recommends	To verify competency and standards of training companies before names are submitted to industry	OH&S	Verify competency and qualifications of programs, and instructors on their list			
			Provide names of only those companies meeting industry and government standards			
WORK SITE SUPERVISION						
18. Operating company's work site representatives must be competent in the tasks being performed	To improve qualifications and experience levels of work site supervisors	Industry associations and operating companies	Develop standard training and experience levels for work site supervisors			
			Hire only work site supervisors with adequate training and qualifications			
19. Qualified on-site supervision for downhole operations	To ensure operating company representatives are qualified and on site during downhole operations	CPA, SEPAC, IPAC, proposed Well Site Supervisors Association and operating companies	Develop standard training and experience levels for work site supervisors including listed minimum requirements			
			Hire only well site supervisors with Level II well control certification and qualifications that meet industry standards			
			Agree to have qualified well site representative on site during any operations related to the well bore			
20. Well site Supervisors' Association	To develop minimum standards for training qualifications and safety	Well site supervisor consultants, oilfield consulting firms and industry associations	Form a Well Site Supervisors' Association			
			Develop minimum standards for well site supervision			
			Coordinate appropriate training through industry training facilities and ensure new consultants receive on-the-job training from experienced supervisors			

of information and cross-referencing

awards

			program for individual employees to provide strong peer and employer recognition of safe work performance
26. Company safety performance awards	To develop award programs for member companies		

RECOMMENDATIONS FOR SPECIFIC INDUSTRY

DRILLING — Drilling Rig Operations

27. Regular safety inspections	To ensure regular inspections with participation of both contractor's rig manager and operating company's representative		
28. Implement job/task observation system	To heighten worker safety awareness and improve communication and leadership		
29. Safety auditing training for supervisors	To train supervisors in work site safety audits		
30. Drilling contractors to implement on-the-job training through TASCAN	To provide on-the-job training to deal with variations in job sites		

DRILLING — Service Rig Operations

31. Training and qualification standards to be developed for service rig personnel	To set minimum standards for training and experience		
32. Service rig contractors to implement on-the-job training through TASCAN	To provide on-the-job training to deal with variations in job sites		

ones on OH&S legislation			
		cross-referencing	
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		Assess safety implications of privatization of any inspection departments before transferring services to private sector	
proactive	Industry and OH&S	Meet and discuss training needs OH&S can provide	
	OH&S	Organize and advertise more training seminars - including ones on OH&S legislation	
	Industry	Increase its use of PITS	
y publications	OH&S	Increase availability and number of copies of regulations procedures and safety publications	
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rating esentatives nd on site ble	CPA, SEPAC, IPAC, proposed Well Site Supervisors Association and operating companies	Develop standard training and experience levels for work site supervisors including listed minimum requirements	
		Hire only well site supervisors with Level II well control certification and qualifications that meet industry standards	
		Agree to have qualified well site representative on site during any operations related to the well bore	
inimum raining and safety ?,	Well site supervisor consultants, oilfield consulting firms and industry associations	Form a Well Site Supervisors' Association	
		Develop minimum standards for well site supervision	
		Coordinate appropriate training through industry training facilities and ensure new consultants receive on-the-job training from experienced supervisors	

			own programs from existing ones and worker input
26. Company safety performance awards	To develop award programs for member companies	Industry associations	Assess whether award programs would be meaningful to members and implement them if research is optimistic (particularly in those associations whose member companies are too small to have meaningful company safety awards)

RECOMMENDATIONS FOR SPECIFIC INDUSTRY SECTORS

DRILLING — Drilling Rig Operations

27. Regular safety inspections	To ensure regular inspections with participation of both contractor's rig manager and operating company's representative	CAODC, CPA, IPAC, and SEPAC	Agree on general rig inspection checklist by combining ERCB, OH&S and CAODC lists.
			Make standard checklist available to member companies
		Operating companies and contractors	Customize checklist to their own equipment and operations
			Conduct regularly scheduled rig safety inspections before and during drilling, and immediately correct any deficiencies
28. Implement job/task observation system	To heighten worker safety awareness and improve communication and leadership	Industry associations and proposed Safety Implementation Committee	Approach PITS with job/task observation training proposal and assess possibility of incorporating it into Level II well control program
			Work with PITS to develop a program for oil and gas drilling operations
			Produce a training program on how to conduct job/task observation
			Ensure all field supervisors satisfactorily complete training and implement new system in operations
29. Safety auditing training for supervisors	To train supervisors in work site safety audits	PITS	Develop and offer a work site safety audit program
30. Drilling contractors to implement on-the-job training through TASCAN	To provide on-the-job training to deal with variations in job sites	CAODC	Advertise TASCAN system to all members for implementation.
		Drilling contractors	Approach CAODC for information and assistance in implementing TASCAN

DRILLING — Service Rig Operations

31. Training and qualification standards to be developed for service rig personnel	To set minimum standards for training and experience	DACC and proposed Well Site Supervisors' Association	Develop minimum training and experience requirements for each service rig crew member
32. Service rig contractors to implement on-the-job training through TASCAN	To provide on-the-job training to deal with variations in job sites	Service rig contractors	Approach CAODC for information and assistance in implementing TASCAN

			awareness programs
			Promote courses to all members and arrange for travelling facilities for smaller oilfield centres
38. Industry and its oilfield truckers to improve work planning and operating standards	To level truckers' work loads as much as possible	OTA	Persuade members to improve advance planning, minimize rush jobs and level work loads

TRANSPORTATION — Production Fluids Trucking

39. Associations to improve membership and commitment	To promote safety awareness among a broader spectrum of the trucking industry	OTA and ATA	Encourage production fluids truckers to join
			Provide information to members on safety regulations, practices and standards, and help members develop their own safety awareness programs
40. Code of practice for trucking of production fluids	To develop a code of practice specifically for companies hauling sour products	CPA, IPAC, PSAC, SEPAC, and ATA	To develop and promote code of practice consistent to policies, standards and procedures that comply with current laws and regulations
		Trucking contractors	Develop individual company policies suited to operations
41. Adopt OH&S Safety Guidelines for Handling and Transportation of Bulk Sour Products	To make OH&S Safety Guidelines an industry requirement	Industry associations	Require member companies to acknowledge in writing their acceptance of these guidelines
		Operating companies	Ensure contractual agreements with trucking contractors include OH&S safety guidelines
42. Spark arresters and positive-air-shutoffs to be required on all diesel-driven equipment used to carry production fluids	To include requirements in operating procedures for all trucking companies hauling production fluids	Industry associations	Encourage members to add this requirement to their regular work procedures
		Operating companies	Ensure all diesel-driven trucks (theirs and their contractors') are equipped with these devices

GLOSSARY OF ACRONYMS

ATA	=	Alberta Trucking Association
CAODC	=	Canadian Association of Oilwell Drilling Contractors
CPA	=	Canadian Petroleum Association
DACC	=	Drilling and Completions Committee
ERCB	=	Energy Resources Conservation Board (Alberta)
IPAC	=	Independent Petroleum Association of Canada
NAIT	=	Northern Alberta Institute of Technology
OH&S	=	Occupational Health and Safety (Alberta)
OTA	=	Oilfield Trucking Association
PITS	=	Petroleum Industry Training Service
PSAC	=	Petroleum Services Association of Canada
SAIT	=	Southern Alberta Institute of Technology
SEPAC	=	Small Explorers and Producers Association of Canada
TASCAN	=	Acronym for task analysis; a method of job observation for drilling rig operations available from CAODC
WCB	=	Workers' Compensation Board (Alberta)

Copies of this Table of Recommendations and the entire Report of the Upstream Petroleum Industry Task Force on Safety are available from:
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